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CERTAIN manufacturers in Pennsylvania seem to be disposed to emulate the worst of the trades-union doings in their dealing with their employés, and we hope that they will be sharply looked after. It seems that the men in a certain mill in Frankford took a dislike to one of their fellows, and demanded his discharge, enforcing their demand by leaving their work until it should be granted. As persons of ordinary intelligence must have a pretty serious grievance against a man to be willing to sacrifice their wages to have him taken out of their way, one would think that the matter presented an excellent subject for friendly discussion between the employers and employed, and perhaps for arbitration, but the Frankford mill-owner thought otherwise, and, instead of trying to come to an understanding with the poor people dependent upon him, he called on the other members of the manufacturers' association to which he belonged to "support" him by turning all their employés out of doors. This, with a blind obedience worthy of the most fanatic trades-unionist, they immediately did, cutting off nine hundred of their unoffending fellow-citizens from their daily work, and depriving their unfortunate families of their bread and butter. This, however, did not satisfy the injured dignity of the manufacturers. Something, apparently, having been said about furnishing pecuniary assistance to the locked-out workmen from labor societies outside the city, the manufacturers' association gave notice that if any one outside of Frankford took pity on their starving men, they would at once close all the mills in the city, turning seventy-five thousand innocent and helpless men and women into the streets, to beg, or steal, or die. We trust, for the honor of humanity, that this horrible threat will not be carried out. The annals of the doings of trades-unions are bad enough, but the worst brutalities of rattening and mill-burning would be trifles in comparison with the crime of depriving at a blow seventy-five thousand people of their living, just at the beginning of winter, simply because one man, of whom very few of the victims had ever heard, chose to make himself, through his choice of subordinates, disagreeable to his dependents, and finding the latter not quite so submissive to his will as he liked, took advantage of his relations with other manufacturers to revenge himself by the ruin of a whole community.

A CURIOUS conspiracy is said to exist among the dealers in coal-tar in the cities of the Middle States, by means of which the price has been raised to exorbitant rates. According to the Philadelphia *Press*, the combination includes dealers in Philadelphia, Pittsburgh, Cincinnati, Washington, St. Louis, New York and Boston, and holds, as a means for enforcing its rules, a fund of more than two hundred thousand dollars, contributed by the members, each of whom agrees to forfeit his share in the fund if he violates the dictates of the association. One of the rules is at present that each member shall have unmolested control of the market in the place where he lives, and his associates are prohibited from selling any tar whatever to persons within his jurisdiction. Another rule appears to be to put up the prices to the highest possible point, and this is said to be now from three dollars and a half to four dollars a barrel, according to the quantity taken, the cost to the dealers being about eighty cents. As the addition of four hundred per cent profit to the cost of the goods naturally checks sales, a third rule is said to be in force, by which the surplus stock, which cannot be sold, and is too bulky to store with advantage, is to be regularly destroyed. Some of the Philadelphia contractors, who use coal-tar in great quantities, naturally dislike paying so much for it, and have, it is reported, endeavored to procure it elsewhere at a price more nearly in conformity with its cost. From the dealers in other cities they got no satisfaction, as these, belonging to the combination, refused to sell to them, but they discovered that coal-tar could be imported from England at a cost of about one dollar and a quarter a barrel, and one or two of them accordingly bought English coal-tar for their purposes. The American combination, however, was equal to the emergency, and, as the *Press* says, proceeded to coerce the offending contractors. One of them, who had been guilty of buying English tar, found himself charged nine dollars a barrel for the next American tar that he bought, and the American ring is said to have controlled some of the inspectors of the Philadelphia paving-department, which uses large amounts of tar, who rejected all work in which they discovered that tar not sold by the combination had been employed. There is probably some exaggeration in the Philadelphia accounts, but as an enhancement in the cost of coal-tar is a matter of considerable importance in building, it will be interesting to know whether the present prices are kept up artificially, and if so, whether there is no means of reducing them.

WE regret to hear of the death at Cincinnati of one of the most respected architects in the city, Mr. William Walter, who, as we learn from the *Commercial*, died last month after a long illness. Mr. Walter was one of the pioneers of Cincinnati, having been brought there by his parents from Pennsylvania in 1828, when he was thirteen years old. His father, Henry Walter, was an architect of the old school, and the young William, after serving an apprenticeship to a builder, entered his father's office, and with him designed the rather famous State Capitol at Columbus, as well as St. Peter's Church in Cincinnati. To these succeeded many other commissions, and Mr. Walter continued in active practice until about eight years ago, when an attack of paralysis warned him that his overtasked system was giving way. He recovered in part from this, but a second stroke prostrated him, and after years of patient suffering, at last put an end to a long, happy and useful life.

MANY architects and others in the Eastern States will hear with regret of the death of Col. Francis L. Lee, one of the oldest and best-known landscape-gardeners in the country. Colonel Lee was born in Boston in 1823, and educated at Harvard College. He inherited a considerable property, and might have spent his life in idleness, but for his passionate love of nature, which led him to devote himself, with a zeal that few professional men throw into their work, to the pursuit of the art which gave the best opportunity for the studies which most attracted him. Too much engaged, perhaps, by the distractions which are inseparable from wealth and position, to give his mind to very important commissions, his practice was chiefly among private proprietors, for whom his exquisite taste did wonders in the development of those beauties of form and color which the good landscape-gardener manages so skilfully. Perhaps the most remarkable characteristic of his work was its subtilty of effect. Although he inclined usually to a natural treatment, as distinguished from the artificial management of grounds, there was nothing careless about his composition. The commonest tree or shrub was to him a means of expression of which he knew perfectly the value, and he used the tints of leaves and modes of branching, as a painter uses lines and colors in his picture. Personally, Colonel Lee would, by strangers, hardly have been suspected of the delicacy of perception which showed itself in his work. Brought up to outdoor pursuits, and associating in consequence chiefly with men, among whom he was very popular, he was rather remarkable for a bluff masculinity which those who knew him soon found

to be only the superficial covering of the kindest and most honest of hearts, and the sensitive feeling of a true artist.

A CURIOUS accident, which had fortunately, no consequences more serious than the destruction of twenty-five thousand dollars worth of property, happened on Long Island not long ago. Every one knows the cylindrical iron reservoirs which have become so popular among the engineers of small town water-works, and already disfigure so many pretty hills, and it is not surprising that the King's County Water Company should have had one built for the purpose of supplying the villages about Coney Island; but the Company required an unusually large one of its kind. For some reason, it was built two hundred and twenty-seven feet high, sixteen feet in diameter at the base, and eight feet at the top. According to the rather unreliable accounts in the newspapers, the plates at the bottom were one inch thick, diminished in thickness toward the top. The whole was of steel, apparently of some quality hitherto unknown, since, according to the Boston *Herald*, the tower was "supposed to be able to resist a pressure of sixty thousand pounds to the square inch." On the completion of the tower, it was tested by filling it to the top with water. Hardly had the pumping ceased when one of the plates near the bottom burst, breaking in two, and allowing a jet of water to escape; and in a moment the tower separated into a dozen pieces, the water poured out in all directions, and the mass of steel fell to the ground. The young engineer who directed the testing was standing close beside the tower when it burst, but happily escaped with no worse harm than a thorough drenching. Not pretending to any skill in hydraulics, we will not attempt to explain the accident. According to Trautwine's formula, which we take to be reliable, the plates were of ample thickness, even if they had been of iron, instead of that wonderful steel which is described, and the most rigid inspection is said to have been given to the material, so that the bursting seems to have been due to one of those unaccountable freaks of steel, the list of which is so rapidly extending.

THE question of the validity of laws in relation to contracts for labor was recently brought up before the United States Circuit Court in Detroit. As every one who reads the speeches of politicians must have observed, it is common now to talk about imported contract labor with affected horror, as if it necessarily involved the abuses of the coolie system; and the popular prejudice has been reflected in legislation, avowedly designed to protect workingmen against competition, to the disadvantage of those who employ them. Not long ago a shipbuilder, living near Detroit, suffered from a strike among his men, and crossed the river to Canada to get others to supply their places. He made agreements with a number of men to come and work for him, but no sooner had they arrived than they were sent home again by the striking workmen, who followed up this proceeding by prosecuting their late employer for violation of the contract-labor law. The counsel for the defence, instead of smuggling his client away under a cloud of exceptions and delays, chose, fortunately for the public, to attack the law itself. We do not pretend to any knowledge of legal science, but it seems to us that some of the points in his argument were very well put. In regard to his client's violation of the United States law in making contracts for labor in Canada, he said that there was no law against this in Canada, and argued that a man could not be punished in the United States for doing something in Canada which was perfectly legal in that country, which, by the way, is the same doctrine that the United States Government has itself been rather strenuously maintaining in another case. Moreover, as a foreigner has a perfect right to come to the United States and work without any contract, Mr. Griffin inquired, somewhat pertinently, why it should be made criminal for any one to hire him to do what he was free to do without being hired, and suggested that the law was here guilty of a slight absurdity. What will be the decision of the court no one can say, and the questions involved are so important that the case may be carried to the Supreme Court of the United States.

AS contrasted with the socialistic view of high explosives, the scientific method of treating them, though less familiar, is interesting. The most extensive investigation yet undertaken into their properties is probably that which has for years been carried on at Willett's Point, in New York harbor, in connection with the United States torpedo-station there, some of the results of which were utilized in the operations among the East River reefs. The usual method of testing dynamite, or similar substances, is to fire them in such a way that their expansion shall indent a block of some soft metal, such as lead or copper, either placed in contact with the explosive, or receiving the impression through the medium of a piston. In tests requiring accurate determinations, the soft metal is employed in the form of a cylinder of a certain length, which, under the impact of the piston driven by the explosion, is shortened, to an extent that can be measured by means of micrometer guages, and on comparing the effect with that produced by the action upon similar cylinders of known forces of a different kind, a good idea can be obtained of the forces developed by the detonation. In the experiments at Hallett's Point, which were undertaken with special reference to the torpedo-service of the United States, the ordinary measurements of the explosive force of various substances were supplemented by investigations into their effect, when fixed under water, upon submerged objects near by. The apparatus used for making determinations of this sort, as described in the *Engineering News*, was very simple and effective. An iron buoy, made very strong, to resist the explosion of the experimental charges, was furnished with a wire rope, of adjustable length, for suspending the cartridges at the desired depth in the water. The rope was attached to the buoy by a link, sliding on a spindle, five rubber rings being interposed between the link and the nut on the end of the spindle, to act as a spring for preventing the full transmission of the concussion to the buoy. The cartridges to be fired were fixed by wires in the centre of a very strong iron ring, several feet in diameter, around the circumference of which were set six pressure guages, in sockets made for the purpose. The cartridges were fired by means of an electric spark from the shore, and after each discharge the ring was raised to the surface, the guages inspected, and notes made of the result. As the essential point of torpedo action is to produce an impression through the medium of the water upon floating objects, it is obviously of the greatest importance to know just what effect will be produced at a given distance by a certain charge of any explosive, and General Abbot's tests, conducted, as they have been, with extraordinary skill and ingenuity, have given the United States torpedo-service the reputation of being the first in the world in scientific understanding of the subject. As incidents in the investigations, many curious notes have been made. Those who have trolled in vain for blue-fish in Newport harbor know well enough that fish dislike the vicinity of a torpedo-station, but the Government tests show that the shock which affects them is transmitted through the water to a great distance, the explosion of a five-pound dynamite cartridge making menhaden several hundred yards away jump out of the water. It is possible that the concussion acts unpleasantly upon the delicate membranes of the gills and swimming bladder, in something the same way that the striking of two stones together under water by a mischievous boy will cause severe pains in the ears of his fellows who may be diving or swimming below the surface in the vicinity, and the detonation of the high explosives would in this way be much more distressing than the comparatively slow combustion of gunpowder. The effect visible on the surface of the explosion of a torpedo is found to depend greatly on the depth to which it is submerged at the moment of firing. A charge of one hundred pounds of good dynamite, fired at a depth of five feet, will throw up a column of water three hundred and forty feet high, and about thirty-five feet in diameter, while two hundred pounds, at a depth of nineteen feet, will throw a column eighty feet in diameter to a height of only eighty-one feet.

A NEW telephone, according to the *Revue Industrielle*, has been introduced by Dr. Ochorowicz. The main point of novelty seems to consist in the magnet, which is in the form of a split tube, and is furnished with a vibrating plate at each end. The two plates are polarized alike, so that when the magnet, under the influence of the current, attracts one, it repels at the same time the other, and the vibrations reinforce each other. The bottom of the box containing the magnet is also made of a plate of tin, fixed at the centre, and serving apparently as a sort of sounding-board; and the effect of the united action of the plates is to increase the efficiency of the instrument in a very marked degree. It is said for instance, that music can be transmitted so as to be heard all over the room in which the telephone stands, and conversation can be distinctly heard several feet away.

NOTES OF TRAVEL.[1]

TOLEDO.

From the Hospital of Santa Cruz.

TOLEDO has been styled not improperly the Faubourg St. Germain of Spain; the city of old memories, with its dingy, weather-beaten aristocracy; its splendid memories of the past and its tattered rags of modern decay; its relics of vast industries and its shiftless hand-to-mouth habits of today; a city wherein the Darwinian theory has been reversed and the fittest in everything, art, science and society, has been slowly dying off through two centuries, while the worthless has thriven among the ruins and taken the first places in what was once the proudest city in Spain. The tale of its ups and downs would fill a volume. The Romans found it a thriving centre of population. Leovigilde, the Visigoth, made it his capital, raised it above the other cities of the peninsular in rights and powers, and renewed it on every side. In 711 the Moors invaded the land, and of the many kingdoms into which Spain was divided by them, Toledo was, for a long time, the foremost. In 1085 the Castillians came over the mountains, drove back the Moors towards Cordova, named the whole country New Castile, and for more than three centuries Toledo was the first capital of Christian Spain, with a population exceeding 200,000, and a vitality in art and industry that is hard to appreciate now. With the establishment of Madrid as the capital of united Spain, Toledo began to die the slow death which has been lasting these three hundred years.

With such a history, no wonder that Toledo is rich in monuments, nor is one surprised to find Romanesque and Moorish, early Renaissance and late Gothic, all mingled together within its walls. Toledo is the centre of Spain, architecturally as well as geographically. From North and South its architecture has been drawn, and fortunately each period did not blot out all the works of its predecessors, so that in seeing Toledo a fair idea can be formed of all the styles which have flourished at different times and in different portions of the peninsular. And there is plenty of good work from each period, though a great deal of it is so hidden away in unexpected ways that the city at first does not promise any of the riches which closer acquaintance reveals. It is a field for the patient investigator, for one who is not daunted in his architectural burrowings by the forbidding glare of the omnipresent Spanish whitewash. Foreigners, somehow, have a notion that the Spaniards are a very dirty people, but to judge by the way in which they whitewash every wall and ceiling showing the slightest leanings towards antiquity, one can hardly accuse them of being architecturally unclean.

Toledo is built on a high, precipitous bluff — the inhabitants declare there are seven hills, and compare them to those of the Eternal City. Around three sides of the bluff runs the Tagus in the curve of a wide Moorish arch — a turbid, rushing stream, too hemmed in by the rocks to do anything but fret and foam and make navigation dangerous. In order rightly to appreciate the extremely picturesque situation of Toledo one ought to arrive at the railway station after dark when the moon is just rising over the distant hills, and, leaving baggage and all cares to follow by omnibus, make the ascent on foot. It is a good half-hour tramp to the plaza, but it is well worth the effort. The road crosses the river by an old Moorish bridge with a monumental archway at either end, and then turns sharply to the right to wind slowly along the steep sides of the cliff. Far above, the square walls of the Alcazar and the few remains of the Castillian fortifications stand out against the moonlight in picturesque silhouettes, and at every turn some new, dim perspective offers itself; a huge jutting parapet, apparently hanging over the edge of the bluff; a lowly, massive brick pile pierced with a wide horseshoe arch; a slender tower rising above a confused tangle of roofs; or a flying-buttress and an angle of a Gothic church; while on the right, as one ascends, the twinkling lights of the few dwellings in the valley seem to stretch out farther and farther towards the darkness of the hills, and one can hear the river roaring and breaking in vague white bands as it dashes over the rocks and under the black shadow of the old bridge. And after winding half way around the city and crossing back on itself the road ends in the quaint Plaza de la Constitucion, lined about with open colonnades and full of mysterious shadows and picturesque outlines. All this looks quite different in bright sunshine, for, however interesting the forms may be, Toledo lacks color, or rather has but one color, a pale brown or yellow, which is repeated in everything, stone, rocks, the mud houses, the pavements, the distant hills, and even the swift-flowing river, so that only under the questioning obscurity of early moonlight does one fully realize the beauty of the situation.

The architectural history of Toledo may almost be divided into two epochs: the brick period and the stone period, the former ending with the expulsion of the Moors and the introduction of Castillian ideas, and the latter reaching down to the time when the city became too poor to build any monuments and contented itself with mud and stone for its private architecture. The Moorish brickwork of Toledo deserves more careful study than it is apt to receive, as it is almost unique of its kind; indeed, excepting the Giralda at Seville and the tower of San Juan at Saragossa, there is hardly any Moorish work existing in Spain in which brick serves as any more than a mere surface to receive stucco ornamentation. In Toledo there are half a dozen or more Moorish towers, all of them graceful in proportions — the Moors never did an ungainly piece of work — and all of them designed in a way which shows that the use of brick was perfectly well understood, even if stucco was generally preferred for finish. Possibly, some of the work which now shows nothing but brick may have been once incrusted with a still richer ornamentation in stucco, though the appearances do not seem to indicate anything of the kind.

One of the most pleasing of these constructions is the tower now forming part of the church of San Tomé. It has been considerably mutilated by time and the Christians, the windows above and below

[1] Continued from page 96, No. 557.

have been partly filled up, and the columns of the light intermediate arcade have disappeared, but the main lines still remain. Who but a Moor would ever make a success of such a combination of plain, broad wall-surface and delicate cusped arches? Those old masters of Spain understood some things about architecture thoroughly. They were never mistaken in proportions, and they knew how to make a plain brick wall interesting by the use of a very little fanciful detail, and by employing the simplest possible features. Another no less interesting piece of Arab work is the old city gate, known as the Puerta del Sol, which is said to have been preserved intact as the Moors left it, though the masonry offers a suggestion of Castillian restorations. In the centre is a round horseshoe archway beneath a wider pointed arch springing from plain columns — a theft from some early Christian church, doubtless. Above is a double row of interlacing brick archings, such as the Moors used so often in their work; on the right a square bastion, against which the city wall abuts; on the left, a huge semicircular tower with an open gallery making the circuit and projecting outlooks on each face; the whole combined in a pleasing, harmonious manner and capped with a battlemented cornice; simple and solid as becomes its character of city gate, but with enough fancy to give it the æsthetic charm which seems inherent in all the handiwork of the Moors.

A building quite worthy of notice, Moorish only in the style of its architecture, is the old Jewish synagogue, built in 1366 by a wealthy Jew whose name has descended to us, Samuel Levi, and possessing an added attraction to the architect from the fact that it was the first instance in which the Jews made use of the Mauresque in the building of a synagogue, a style which has proved so acceptable to Jewish ideas that it has been generally adopted ever since. This old temple consists of a single nave with no chapels or niches, and plain walls unbroken save by the few narrow lancet windows and by a broad stucco frieze of the richest Moorish design. The ceiling is of wood, hipped all around, with traces here and there of gilding and color decoration and a few bits of elaborate carving. The Jews were driven out in 1492. Since then the synagogue has been known as the church of Neustra Señora del Transito, until within quite recent years, when the government has claimed it as an historic monument.

Another reminder of the Jewish period is the church of Santa Maria la Blanca, once a synagogue, successively a catholic church, a reformatory for women, a soldiers' barrack, an army store-house, and now in the hands of the Commission of Ancient Monuments, which has restored the elaborate detail with more or less success, applied whitewash freely, but rather indiscriminately and placed the mutilated remains under the charge of the government. In plan, this synagogue is essentially the same as a Moorish mosque; an oblong divided into five aisles by rows of piers and arches supporting a wooden ceiling which is level over each aisle but raised higher at the centre, somewhat after the manner of a Christian basilica. The architecture has suffered so that one can only speculate on the richness which once adorned it, but the few scattered bits of tiling and poorly restored ornaments can give an idea of what it might have been.

Leaving the Moorish work — for space would fail to notice even a tenth part of the remains of this style scattered about Toledo — the cathedral is the building of the stone period which claims the first attention, both from its size and the intrinsic merit of its architecture. The Spaniards have made the bishop of Toledo the primate of all Spain, and they fondly regard the cathedral as one of the wonders of the world, perhaps with more reason than would be at first suspected. The construction was begun in 1227, and extended through two centuries and a half. The style is Gothic, of singular purity when it is remembered to what vagaries Spanish Gothic sometimes descended. The façade is quite irregular. Three richly-ornamented portals occupy the width of the church. On the right is a high, octagonal cupola rising over one of the chapels, and on the left, symmetrically placed in elevation, but projected boldly from the façade, is the tower shown by the sketch, a lofty structure which starts from a plain basement, extended half the height of the church, the walls and square buttresses above being panelled and treated in a manner recalling the campanile of the Florence cathedral. The only windows in the tower are at the very top, just below the platform. The lantern is later and more florid in style. The octagonal spire is terminated by a series of globes and an iron cross, and is encircled by three bands of wood in the shape of crowns of horizontal rays, supposed to represent the crown of thorns — a curious idea and a curious effect which is not altogether bad. Each transept has an elaborate entrance, that on the north being peculiarly picturesque in arrangement and treatment, and so enclosed by tall, projecting buildings as to give most delightful half-glimpses as it is approached from the steep, narrow alleyway before it. None of these entrances are used, however, except on fête days, access generally being had to the cathedral through the cloisters at the north of the façade.[1]

To attempt a description of the interior of the cathedral would be wasted effort. The Spaniards, more than any other people, are prone to overcrowd their churches, to multiply riches to such a point that one is apt to retain only a confused idea of a blaze of gilding, a profusion of elaborate grille-work, rich, dark old canvasses, intricate vaulting, and general indefiniteness as to further detail. Besides, in Spain the church is primarily for the use of the priests, and three-quarters of the nave as well as all of the choir is enclosed by high screens, which while affording additional field for the efforts of the sculptor and decorator, and so adding to the richness of the interior, quite interfere with anything like general effect. Then, too, the stained-glass windows which form so important a feature of the northern interiors are reduced to a very small compass in Spain, and placed high in the walls, shedding only a subdued light in the church. The Toledo cathedral is not as obtrusive in the character of its internal architecture as most of the Spanish churches; but it has its full share of all the redundancy which is so perplexing when one tries to grasp the general scheme, and yet is so delightful when one does not care a fig which is the transept or how many aisles there are, but is willing to wander about from one rich bit to another, and enjoy the whole by taking in its parts. Later on, reflection, and a judicious reference to a guide-book will tell one that the cathedral is five-aisled, and has transepts, ambulatory, triforium and clerestory after the manner of all well-behaved cathedrals, and that it measures three hundred and seventy-three feet in total length, by one hundred and eighty-eight in width; but mere statistics or guide-book notes can give one very little idea of so thoroughly Spanish an interior as this. There are rich mosaics, curious old tombs, a chapel devoted to the Easter puppets and processional vessels, all ablaze with gems and precious metals; a triple range of choir stalls of which Théophile Gautier speaks as an "*œuvre effrayante de details;*" a couple of huge, bronze pulpits, half-a-dozen finely wrought-iron grilles; colossal organs hanging over the choir stalls; a sacristy packed with tier after tier of richly-embroidered vestments; a baptismal font six hundred years old, and a thousand other attractions — far more than any one mortal can ever hope to comprehend.

The Church of San Juan de los Reyes is the most pretentious edifice of Toledo after the cathedral. Erected in 1477 by Ferdinand and Isabella in commemoration of their victory over the Portuguese at Toro, it was destined as a place of royal sepulture and was greatly enriched by the Catholic sovereigns, though ultimately neither of them was buried there. The style of the church is very late Gothic or early Renaissance of a type whose principal attraction is in the infinite amount of work expended rather than in any intrinsic beauty of idea or design. Some parts of the interior, a broad, single-aisled nave, are not bad, however. The piers are covered with richly-carved arabesques; an elaborate gallery in stone extends all around the church; and each end of the space corresponding to a transept is covered with ornamentation: below, rich, pointed arches; above, a gallery divided by columns into niches for statues, hung with the emblems of Castile and Arragon, and adorned with the interlaced initials of Ferdinand and Isabella. Adjoining the church is a fine old cloister, said to be the best existing example of the Spanish Gothic.[2] When the Moors were driven out of Spain, Ferdinand and Isabella presented to this church the heavy iron chains of the Christian captives delivered at Malaga. These chains are still preserved, and are hung about the exterior of the choir in a manner which adds not a little to the effect.

Of the Renaissance period, Toledo possesses a great variety of examples in all shades of style, from such early work as illustrated by the court of the Hospicio, with its short, heavy columns and curiously bracketed imposts, to the light, well-proportioned work represented by the court of the Alcazar, where the imperial eagles figure in the spandrels to show that Charles V once ruled in Toledo. More interesting than either is the ancient hospital of Santa Cruz, erected towards the close of the fifteenth century, a fine example of what the Spanish architects designate as the Plateresque — the style of the silversmiths; a style which is sometimes pretty bad, and is apt to be rather hap-hazard in its proportions, and uncertain in its quality, though generally abounding in those delicate, sharply-cut details and effective arrangements of high lights and shadows which are so satisfactory when executed in silver on a cup or a salver, and are at the least interesting when rendered on a larger scale in stone, as in the present instance. One good feature of this class of work is that the figures, which are used so freely in relief and in the round, are always well executed, besides fitting nicely into the general scheme. The Plateresque is about as near as the Spaniards have ever come to developing a style of their own. Truly it is only a degenerate, or perhaps more precisely an undeveloped early Renaissance, and corresponds exactly to what the same period produced in England, France and Germany; but the Spaniards added a whimsical, playful treatment which no northern nation would have thought of, and they so introduced fanciful iron grilles at the windows, curious wrought knockers at the doors, and bold, expressive figure carvings in unexpected niches and reliefs, that however hard it may be to define, the Plateresque style is full of individuality and quite different in character from either Elizabethan or Francis I.

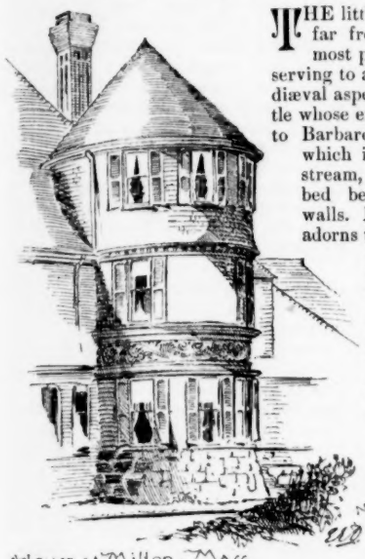
We are told that a year would no more than suffice to become thoroughly acquainted with Toledo. A few days stay will speedily convince the traveller of how much there is to study in this strange confusion of narrow, crooked streets, wherein so many different styles of architecture are piled pell-mell over Moorish or even Roman foundations. On every side are reminders of decayed nobility and poverty-stricken municipality; and the street is poor indeed, which has not at least one wide-arched portal with massive oak doors, bound with iron, surmounted by a battered coat-of-arms, and studded over with the great, round nail-heads which the local diction designates as *medias naranjes* — half oranges. Toledo alone is well worth the fatiguing journey through Spain. It should be taken first, however, in order rightly to enjoy it; taken while everything Spanish is

[1] A view taken in the cloisters of the Toledo cathedral was published in the *American Architect* of October 4, 1884.

[2] For a view of this cloister see *American Architect*, No. 456.

new to one, and the senses are keenly alive to all the strange things which are found everywhere in Spain. Later, the very quantity of the attractions in the old imperial city would be sufficient to daunt any but the most indefatigable student. C. H. Blackall.

ART IN ALSACE AND LORRAINE.[1] — III.



House at Milton, Mass.
Mr. J. Putnam, Arch't, Boston.

THE little town of Kayserberg not far from Colmar is one of the most picturesque in Alsace, preserving to an unusual degree its mediæval aspect. The donjon of a castle whose erection is locally attributed to Barbarossa dominates the town which is traversed by a lively stream, tumbling over its rocky bed between ancient confining walls. Much interesting sculpture adorns the parish church, certain parts of which date back to the twelfth century. The town-hall is a pretty Renaissance structure with a rich wood-carving in its interior; and several ancient churches and chapels in the neighborhood deserve the tourist's attention.

Mulhouse, on the other hand, shows few architectural remains of an early date, its importance being commercial and comparatively modern. Its most interesting structure is the town-hall built in 1551 with polychromatic exterior decorations and a roof of red and green tiles. But the local historical collection — devoted entirely to the antiquities of the town and its immediate neighborhood — is singularly well planned and very rich in many departments. And not far away is the village of Ottmarsheim with a little church which is attributed to the Carlovingian epoch. In plan it is an octagon, the central-domed space being surrounded by massive piers bearing great arches of a single order, square in section, and wholly without ornament. Between each pair of piers is an arcade, rising to the springing of the arch, and supported by two slender columns with plain cushion-capitals; and above, unconnected by any secondary arches, but with their capitals rising to the crown of the great arch itself, are two smaller columns forming a kind of simulative triforium. One cannot but be interested to trace, in spite of many variations, the same idea which was sometime worked out by later and far distant builders — as, for instance, in the late Norman nave and choir of Oxford Cathedral.

The Church of Thann is more familiar to the student of books, and less exceptional in interest — a charming, tall slender structure, dating from the thirteenth and the two succeeding centuries, with a lofty tower and spire attached to its northern flank, and very elaborate late-Gothic portals.

The parish church at Guebwiller is in the transitional style of the twelfth century, with the round arch still dominant; the Dominican church of the same town is of the thirteenth century and contains remains of contemporary mural paintings; and not far distant is the Abbey of Murbach whose lords were once princes of the empire, and could boast of the name of Charlemagne upon their roll. The nave of the abbey church and its spire have been destroyed, but the choir and two square Romanesque towers, rising three stages above the roof, still survive. In the same neighborhood, again, is the village of Lautenbach, where the church is remarkable for a large and extremely elaborate porch of thirteenth-century origin. It is three bays in breadth, and two in depth, and covered with curious and interesting sculpture. In short, there seems to be scarce a village in the whole province of Alsace where the ecclesiastic art of the Middle Ages has not left relics that are always of interest, often of great antiquity, and not infrequently of unique character; and scarce a hill that is not crowned by the picturesque remains of civic and military building.

Turning now to the sister province, we may glance first at that City of Metz which has played so large in part in the active history of Europe, and is so identified in our mind with things political and military that we may feel, perhaps, as though nothing more artistic than fortifications could await us there. But in truth it contains much that is of the highest architectural interest, beginning with the large and beautiful cathedral. A church of the Carlovingian epoch had succeeded on this site a still earlier chapel, but was destroyed in the twelfth century. Reconstruction was immediately begun, but slowly and with many mutations of plan and design. Not until the middle of the fourteenth century was the structure given its present shape, and many parts are of still later date — the tower and the choir being of the end of the fifteenth century and the façade Renaissance in style. French fourteenth-century fashions show in the extreme elevation of the church — which with a length of three hundred and eighty feet has the height of one hundred and thirty-five; in the beautiful geometrical design of the immense windows, and in the general slenderness of all interior features. But the plan is German rather than French, the five-sided apse being without aisle or chapels. It is such facts as these, of course, which give the buildings of these provinces their peculiar interest; and it is singular, as I have already said, to see how wholly blind is the author now under review to their existence. The cathedral was once very richly decorated and furnished, but late Renaissance and modern vandalism has denuded it of almost all its treasures. The great rose-window, however, still keeps its fourteenth-century glass and those of the choir theirs of the sixteenth. The font is interesting as having been made out of an ancient Roman porphyry bath, and the episcopal throne as having been re-worked from portions of antique columns.

The Church of St. Vincent in Metz is not mentioned by our author, but is an interesting structure, with parts of every epoch from early Romanesque to late Renaissance. It was intended that a pair of towers should flank the choir — an arrangement which was quite common in this district.

The local museum of painting was founded only in 1839, but contains some good Dutch pictures and among its modern works Corot's beautiful idyl called "The Shepherd," famous as having been the first of his works to be sold, and the first to be engraved. The archæological museum includes a number of Græco-Etruscan relics from the old Campana collection and many objects of Gallo-Roman origin. The country round about Metz is full of traces of the Roman dominion, most striking among which is the aqueduct of Jouy. Of the long arcade which once crossed the Moselle there remain five piers on one side of the river, and seventeen with their arches on the other. The portion which actually spanned the stream seems to have been carried away by the water at a very early date, for a writer of the tenth century speaks of it as having perished long ere his day. According to some archæologists, Drusus was the builder of this aqueduct.

A very different town from Metz is Nancy. Few European cities wear so great a unity of aspect, its ancient estate having been wholly transformed in the last century and modern hands having added little since. An ancient walled town when Stanislas, last Duke of Lorraine, ascended the throne, it was turned by him into the very type of eighteenth-century civic elegance; and as such it still survives. It streets are straight and similar; its gateways so large and fine that, to quote our author they look like "veritable triumphal arches;" and its main square, formerly called the Place Royale but now the Place Stanislas, is all but unequalled in Europe for harmony and stateliness of design and charm of decoration. In plan it is a large rectangle (as usual, M. Ménard gives no figures) with cut-off corners. On one of its sides stands a large triumphal arch; opposite to this the great Hôtel de Ville; and rows of stately dwellings complete the circuit in uniform design — Corinthian pilasters rising through two stories above the basement and the windows they divide being adorned with balconies. The architect who thus remodelled the town for Duke Stanislas was Emanuel Héré, son of a local physician and evidently an artist of scholarly training, great vigor and excellent taste. But fine as is his work, it interests us less than does that of one of his collaborators — Jean Lemour, the famous iron-worker. The entire city is full of his products. Gates protect the entrance from the various streets into the Place Stanislas; brackets for lights project from the encircling houses; the many balconies just referred to have elaborate iron screens; the great staircase of the town-hall is similarly protected and the chapels of the cathedral enclosed in the same manner; the neighboring Château of Commercy boasts a splendid gateway, and many lesser dwellings in the various streets show minor trophies. All this wealth of delicately, beautifully, and variously wrought metal came from the workshop of Lemour, and yet his masterpieces still remain unnoted — the magnificent *grilles* which stretch across two corners of the Place Stanislas and connect the town-hall with the buildings on either hand. Our author does not give their length, but he notes that in their highest portions they rise thirty-eight feet and from his illustration we may guess at some fifty feet of extension for each, covering a quarter-circle on plan. Each is so designed as to form three portals (the central much the largest) which, however, are not true gateways but frames or settings for fountains. These fountains, designed with the rock-like substructures and basins and the groups of mythologic, aquatic figures so characteristic of the Rococo period, were the work of two local sculptors — Guibal and his pupil Cyffle — and are singularly graceful, charming, and unexaggerated examples of their kind. Taking the conception as a whole — the stately palaces, the magnificently elaborate iron-work with its touches of gilding, the florid and animated groups, the spouting streams (we may suppose they *do* spout) and the background of thick foliage against which the harmoniously united stone and metal work is relieved — we have a most noteworthy example of that accord in idea and execution between artists in different branches from which alone can spring the finest architectural results. And we have a proof, moreover, that however the art of the time of Louis Quinze may have lacked for purity and depth and feeling, and for that highest beauty which depends upon these, it stands almost without a rival in the work of what I may call scenic decoration.

[1] *L'Art en Alsace et Lorraine.* Par René Ménard. Paris: Librairie de *L'Art*; Charles Delegrave. Continued from page 169, No. 563.

Lemour's iron-work deserves attention for its own sake, moreover, as well as for its effectiveness as a factor in Héré's scheme. His personality is made known to us through a large volume containing reproductions of his works from his own drawings, and a voluminous text which not only tells, in truly epic style of the perfection of his results and the difficulties which attended their production, but also traces in a delightfully naïve and imaginative way the history of the forger's craft from the days of Tubal Cain, and enthusiastically vaunts its practical and artistic importance. We may be amused at times by the exaggeration of his phrases and the egotism of his point of view; but the general result left upon our minds is that of admiration for one who was so confessedly and contentedly an artisan yet so thoroughly an artist, and was so passionately devoted to his own branch of work that he could not help seeing others in a somewhat distorted perspective. It is not philosophical criticism we want from an artist but contagious enthusiasm; not a just estimate of the comparative value of the medium he works in but such an appreciation of it as shall open our eyes to its highest worth and possibilities; and these are the things we find in Lemour's pages.

His designs, considered from a scenic, decorative point of view, are, as I have said, extremely admirable; and from a purely artistic point of view they have great charm and beauty — the general conception being dignified, harmonious, well-proportioned and well-balanced, and the supple, graceful Rococo details being treated with marvellous dexterity, originality and freshness of feeling. No one ever understood better than he that great principle of decoration which is so seldom mastered to-day — and nowhere more seldom than in work of the same character as his — the art of so covering the field that it shall be neither empty nor over-crowded, and of preserving throughout all mutations of detail the same general balance between motive and background. No Rococo ironwork is better than Lemour's — I think even the famous gateways at Würzburg are not so good, being less refined in feeling, less reticent in design, and heavier and more exaggerated in detail. But even the best Rococo ironwork — beautiful, seductive though it is, is not thoroughly "good" if examined from the point of view of the properties of the material and the exigencies of its manufacture. If we look at the illustrations in M. Ménard's volume — at least at such of them as are mere outline elevations — we might hardly guess that they represented wrought-metal work at all. That is to say, like all other products of the period, Lemour's *grilles* are architecturally conceived in imitation of structures built up of hewn materials. His great gateways stand on high solid plinths, with elaborate mouldings carefully profiled as though the chisel had been at work. From these rise lofty pilasters bearing arches and rich entablatures crowned with vases and trophies imitative of solid forms. Of course the whole structure is open, the main, forming members being united by lace-like tracery simulating sculpture in relief. And of course the design, though inspired by designs for stone, has been modified to suit the material and is executed with minor forms and details possible of realization in no other substance. But this does not do away with the fact that it *was* inspired by designs for stone — that the whole scheme is, from a true ironworker's point of view, a wrong scheme, proceeding from the desire to do something else than the most natural and straightforward work of which the material was capable.

Lemour himself dwells constantly and in the strongest terms upon the difficulty of his tasks — tells us how extraordinarily hard it is to hammer and weld his metal into such lithic shapes, what time, and patience, and accuracy of hand and eye go to the drawing of such accurate, strong, straight lines, the building-up of such elaborate architectural forms, the uniting into a single frame of such solid factors as form the basis of his designs. It was all honest smith's work he put into his products — all hammered, and welded wherever possible (nay, where one might have thought it quite impossible), and elsewhere firmly riveted — never cast or moulded. And the more one studies the non-metallic character of his conceptions, the greater grows one's admiration for the skill which could execute them thus as well as for the inventiveness and good taste which could imagine them so charmingly. But all the same, I say, it was in a certain sense mistaken taste and misapplied skill; and his own proclamation of the difficulties over which he triumphed does but prove the fact. A smith of an elder day would have found cause for glory in submitting to the natural requirements of his material; in drawing from *these* the beauty of his results; and in pointing out how essentially appropriate to travail of the fire and hammer were his lines and forms — not how difficult because *inappropriate*.

All of which things it is well to remind ourselves of just now, since our own use of iron is just beginning to assume the station and to have the ambitions of an art; for nothing is more seductive to the unreflecting eye than Rococo ironwork, and no books are more easily misleading to the novice than such as Lemour's. But having thus done what I conceive to be my duty, I will frankly confess that this is one of those cases we sometimes meet with in our study of art when, in spite of a knowledge of what is "good" and what is evil, and a willingness to accept the theories thereupon dependent as guides for practice, one cannot help almost preferring the evil to the good when one actually sees it. It has been my good fortune to study much ironwork of many epochs in many lands. Much of it is certainly more rational, some of it is certainly more beautiful, than that of the Rococo epoch; but none is so splendid, so triumphant, so superb, so imposing. And there are certain moods in which even the greatest purist among us prefers splendor to purity and grandeur to beauty itself. In such a mood we may perhaps confess that Lemour "ought not" to have used his metal as he did — but how glad we are that he *did!* There is a lawlessness which is a law unto itself — there are "illegitimate" results which do superbly well without any fathering from theoretic approval; and the splendid structures in iron of the Rococo epoch are among them. If I were not afraid of being accused of confounding small things with great and getting too much in the mood the artist of Nancy dwelt in himself (without the excuse which he had as an artist possessed by his art), I should say that we may consider such efforts somewhat in the way we consider the audacities of a Michael Angelo in paint. Theoretically they are not to be commended — of a surety they ought not to be imitated — yet how great a good fortune it is that they were executed!

The Hôtel de Ville at Nancy contains the museum of paintings, which is the richest in the provinces, possessing some excellent Italian pictures, a greater number of good examples of the Netherland schools, and certain admirable French pictures of the eighteenth century. These last, then a little out of fashion, were sent by the consular Government to decorate the Hôtel de Ville at the time of the Congress of Lunéville, and have never been returned to their original resting-place.

The ancient ducal palace of the city, famous for the splendid late Gothic portal that has so frequently been reproduced, contains the museum of antiquities which, however, was partly destroyed by fire soon after the entrance of the German army in 1871. Its greatest treasure was fortunately preserved — the splendid tapestries found in the tent of Charles the Bold after the battle of Nancy. They consist of seven immense pieces, covered with allegoric and historic figure-subjects and are the largest and finest of the kind in France.

Lunéville is another town which shows few remains of earlier than eighteenth-century date, though it is said to derive its name from the fact that Diana was worshipped there in Roman times, and though certain statues found in its soil seem to confirm the belief. Its finest building is the château, now used as a barrack, with a park that was once very famous but has been allowed to fall into great decay. St. Nicholas-du-Port has a late flamboyant-Gothic church, and Toul two churches of much interest. St. Stephen's, formerly the cathedral, is apparently of the thirteenth century (once more our author gives no date) and a peculiarly pure yet rich example of the time. Its beautiful glass still remains in part and its episcopal chair is a marvel of delicate sculpture. But in many details, and especially in its splendid west portal, it suffered greatly at the time of the Revolution. The Church of St. Gengould, in the same town, contains many interesting tombs and is also of a pure Gothic type with cloisters from the latest epoch of the style.

The church at Epinal goes back in part to the tenth century and in part is transitional. M. Ménard gives an illustration of its main portal which reveals a work of great beauty, and, considering its location, of some singularity. It is late but still pure Romanesque, and although very rich, bears no figure-sculpture whatever save a single figure of Christ in the tympanum. The arch is recessed in six orders, each supported by an attached column with a delicate foliated capital. The architraves themselves are square in section and enriched with chevrons, billets, Greek frets and similar motives which are far more Norman than southern in effect. As a piece of purely conventional decoration it is extremely interesting and admirable and, I repeat, unusual in a land where the figure-sculptor's chisel was so profuse of its products.

The Church of Bar-le-Duc and the Museum of St. Mihiel contain many sculptures attributed to the great local Renaissance artist, Ligier Richier, whom I have already mentioned. So great is the diversity between them, however, that we must believe the attributions in many cases erroneous. His work may well be acknowledged in a fine group of St. John supporting the Virgin which is all that remains of a vast competition once placed in the choir of the church of St. Mihiel. It is mediæval in feeling but shows the results of classic study in the beautiful arrangement of its draperies. But the same hand that wrought this can hardly have created certain other groups and figures whose aspect and accompanying architectural details speak of the seventeenth century.

M. G. van Rensselaer.

The Illustrations

Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE FIRST SPIRITUAL TEMPLE, BOSTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Gelatine print issued only with the Imperial and Gelatine editions.]

THE First Spiritual Temple is situated at the corner of Exeter and Newbury Streets. The materials employed in the construction of the exterior are best Longmeadow freestone and Braggville granite. The basement contains a lecture-room, with seating capacity for five hundred, and a library and reading-room, as well as room for heating-apparatus. The principal story is occupied wholly

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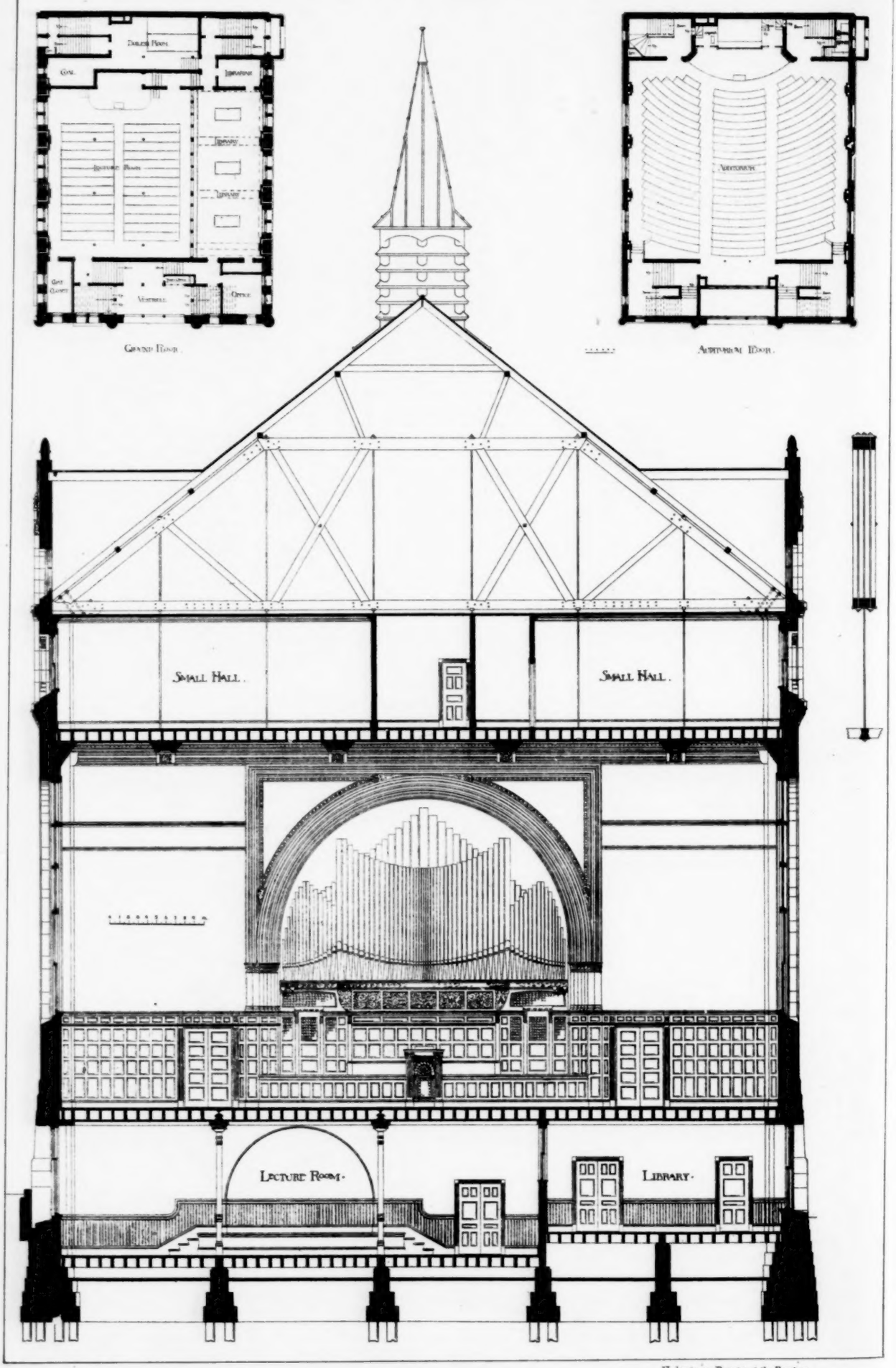

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FIRST SPIRITUAL TEMPLE - BOSTON -

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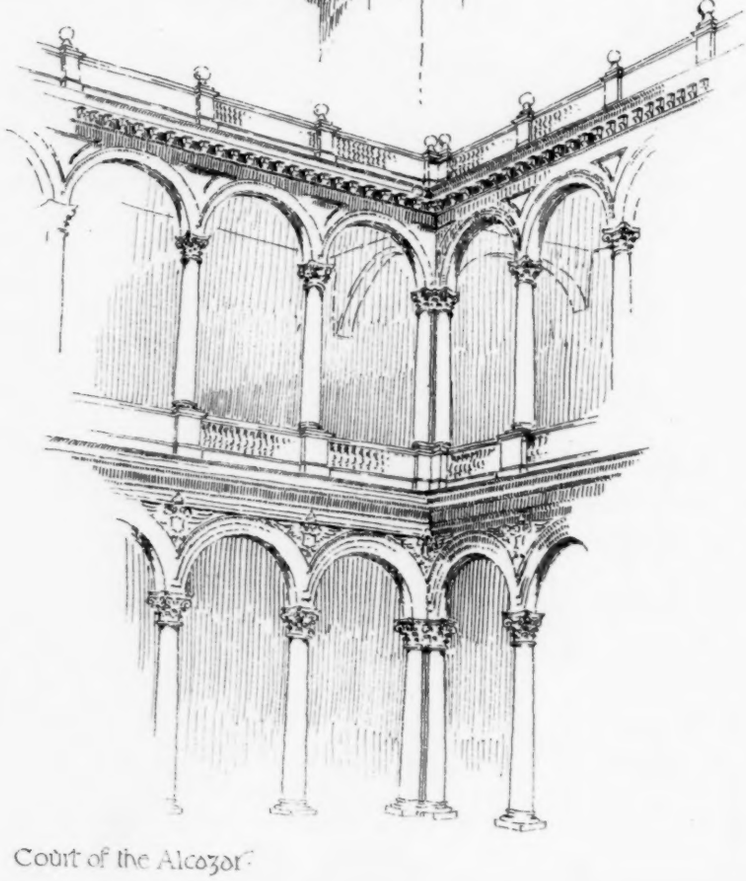
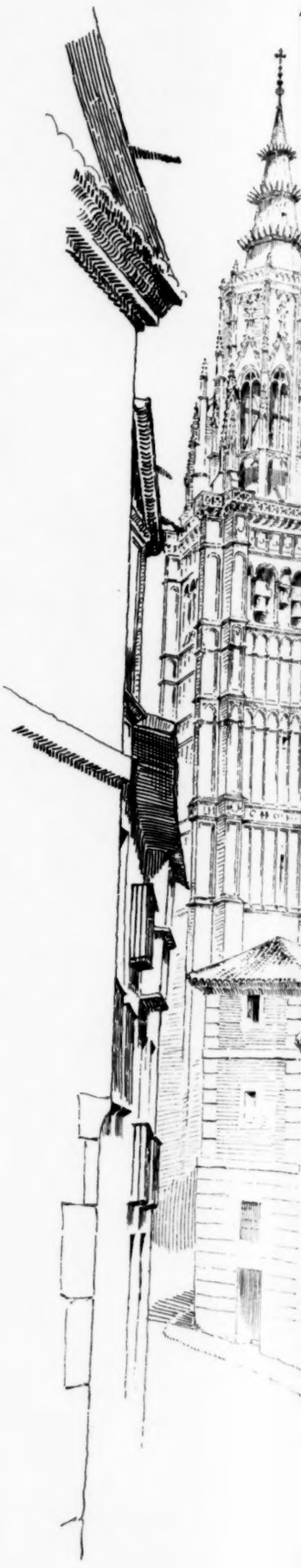


Court of the Alcazar



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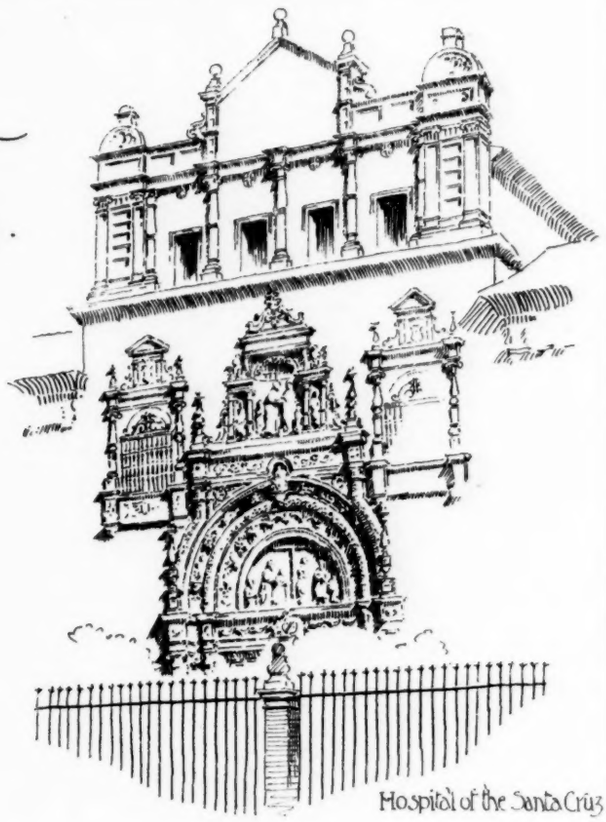
Sketches from ~TOLEDO~ ·SPAIN·

~by C.M.Blackall.~

The Cathedral Tower.



Hospital of the Santa Cruz

Puerta del Sol.

Heliotype Printing Co. Boston.

Retched by P.P.Udin Deane.

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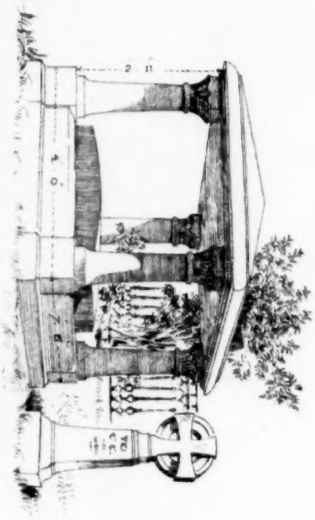
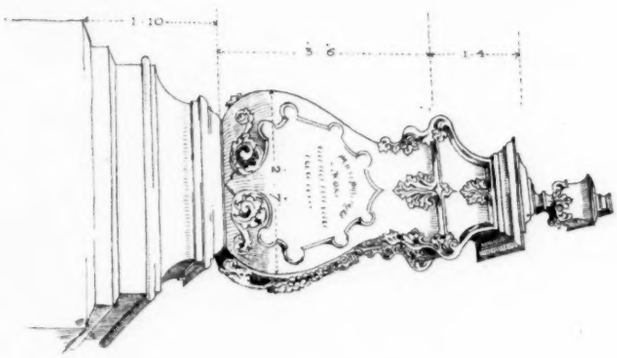
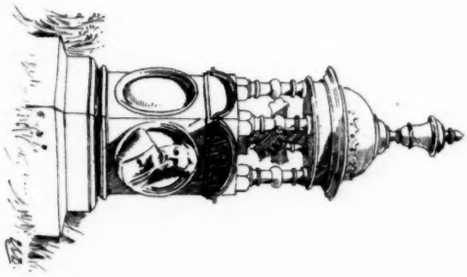
MONUMENTS

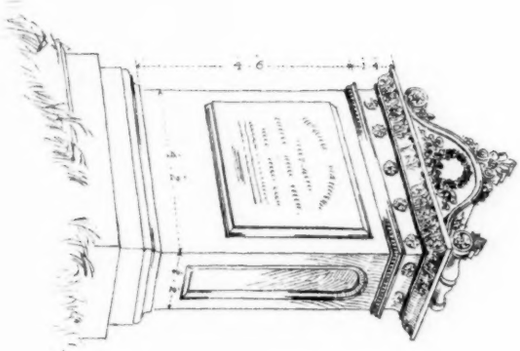
from the Cemeteries, Boston, Mass.

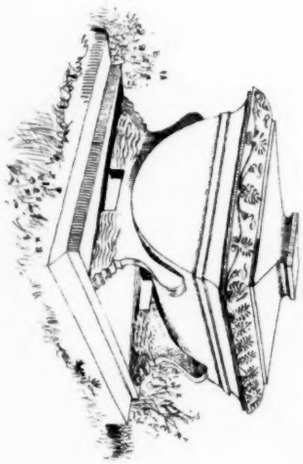
Sketched by F. Eldon Deane.











by the large hall, with gallery, organ-chamber and speakers' platform. Thirteen hundred persons can be seated. Over the hall, suspended from the roof-trusses, is a story of rooms of various sizes, from a lecture or class room, about 30′ x 40′, to rooms 18′ x 26′, all reached by staircases at each end of the building, with a central corridor connecting the two. The interior finish is of oak and of stained whitewood. The work has been very thoroughly done, at a cost of $138,266.61.

PLANS AND SECTIONS OF SAME.

TOMBSTONES IN CEMETERIES IN AND AROUND BOSTON.

SKETCHES AT TOLEDO, SPAIN. MR. C. H. BLACKALL, ARCHITECT, BOSTON, MASS.

For description see "Notes of Travel" elsewhere in this issue.

HENRI REGNAULT.[1]

THE tragic death of Regnault was in harmony with his life and temperament. Impulsive, enthusiastic and headstrong, he was ever inclined to rebel against authority: and so we find him throwing away a valuable life in a vain endeavor to injure the victorious enemy. The battle of Buzenval had been waging fiercely all day, and it was only from sheer necessity that the retreat was sounded. What could a handful of men, who had gone through continued privations during the siege do against an enemy many times more numerous, and, withal, better disciplined, better fed, and better commanded? And so, as evening drew on, it was thought wise to retire; but Regnault, instead of obeying immediately, cried out, "*Le temps de lâcher mon dernier coup de fusil, et je vous rejoins.*" He belonged to the new France. He possessed the revolutionary temperament, the rebellious spirit which is often a virtue in art and literature, but which is always a vice in a soldier — perhaps proof positive that highly-civilized beings are not fit to inhabit this nether world, where brute force and diplomacy, otherwise dishonesty, alone succeed and reign supreme. Regnault was in perpetual revolt against authority, either that of his father, or of the Institute, or of the world at large. He wished his "Judith" to be his first *envoi* from Rome, but the rules prescribed a study of the nude, and thus we find him in a letter complaining of this "*joug du réglement*" which he had such difficulty in bearing. Gifted with an indomitable will, and an enormous faculty for surmounting difficulties, he became an expert in swimming, walking, gymnastics, riding, and all manly sports, completely revolutionizing his physique, which, from being weakly and puny, developed into strength and agility. He delighted in danger of all kinds — from the time when, as a child, he entered a lioness's den, the better to sketch her, to the day when he foolishly braved the German bullets. Endowed with a passion for strong contrasts, we find his letters full of enthusiastic exaggerations about men and things; indeed, they are the most interesting part of M. Marx's book. His love of sunshine was as strong as his hatred of gloom and fog: without light he could not live. "If poets love winter," he writes, "and evenings spent by the fireside, we painters abhor all that is not bright and light—the beautiful sun and lovely heat, which enables us to work in shirt-sleeves and slippers. We cannot paint with our feet in a *chancelière*, we want freedom for our movements; we want a blue sky. Perhaps later on I may find a more equable climate than ours, where I shall always have the blue sky over my head." And, again, from Tangiers he writes, "God forgive me, but I cannot think that the sun which lights your part of the world is the same as ours; and I contemplate with terror the time when I shall have to look upon the dismal crowds and houses of Europe. But ere I depart I mean to make the real Moors live again. . . . Then to Tunis, then Egypt, then India! . . . I shall rise from enthusiasm to enthusiasm. I shall intoxicate myself with marvels until, completely *halluciné*, I shall be able to drop down into our sad and common-place world without fear of losing the light which my eyes have drank in during three or four years. Then, in Paris, when I want to see clearly, I shall only have to close my eyes, and visions of Moors, Tellahs, Hindoos, enchanted palaces full of gold and lapis, white marble elephants, and, in fact, all the East, will appear to me afresh. . . . *Ah! quelle ivresse, la lumière!*" Fate declared otherwise; and, instead of this beauteous vision, he was doomed to return to his native city to find her clad in misery, cold and suffering.

Towards the end of December he writes to his *fiancée* from the advanced post of Colombes, "At last, this interminable night is over! Ah, my poor friend, it is horrible! But I will not grumble, as many have suffered more than I. Three times during the day have we changed the camp. . . . An icy wind threatens each minute to carry off our tents; we are entirely exposed to this icy tempest; everything freezes in our saucepans; our feet become insensible. Oh! I can talk feelingly of the cold, and know what it is to pass a night upon the bare earth, exposed to a freezing blast. Four of our men were frozen, one of them a sergeant. . . . But enough upon this subject. I will warm myself at your fireside. *Je vous aime; j'aime mon pays, et cela me soutient. Adieu.*" Strange, he had a presentiment that he would die young; and it was this idea, doubtless, which made him take in everything with such avidity. "It is a characteristic of his nature," says Jules Claretie, "to be always pushing on: *En evant!* — go ahead, as the Americans say. What he had in his mind soon made him forget what he had just put upon his canvas. 'My brain must be upside-down, that I can never do things at the right time. . . . I live from day to day without thinking of the future. I want to gallop on horseback, to fly from one trapeze to another, and to paint *chefs d'œuvre*, all at the same moment.'" He worked indefatigably from morning till night. Artist by nature, he could use any medium equally well — oil, water-color, charcoal, lead-pencil, pen-and-ink. That he had the feeling of a poet is also seen in his letters from Grenada, which he describes as "*la plus belle des plus belles, la Grenade au ciel de lapis, aux tours et forteresses rosées,*" and the Alhambra as "*en or, argent, diament, enfin en tout ce qu'il y a de plus riche au monde.*" "*Tous les matins, nous allons dans la divine Alhambra, où les murs sont des dentelles d' améthystes et de roses le matin, de diament à midi, et d'or vert et de cuivre rouge au coucher du soleil. Nous restons là jusqu'à ce que la lune vienne nous voir, et, quand elle nous a envoyée quelques baisers et qu'elle a endormie les ombres des fées et des génies qui ont ciselés ce palais merveilleux, nous nous en allons à regret, nous retournent à chaque pas sans pouvoir arracher nos yeux de ces colonnes de marbre rose, qui prennent, par moment, les couleurs nacrées du corps satiné d'une déesse, et sont notre désespoir et notre bonheur tout à la fois. . . . Ma divine maitresse, l'Alhambra, m'appelle; elle m'a envoyé un de ses amants, le soleil, pour me prévenir qu'elle a fait sa toilette et que déjà elle est belle et prête à me recevoir. Je ne peux faire autrement que de vous quitter.*" Again, from Marseilles, when he describes a little excursion by boat, "*ou la petite nacelle semblait fière d'être seule vivante et seule à fendre l'eau avec ce petit clapotis dont la musique est si agréable au milieu du silence.*" And, again, "*La lune s'était couchée, les côtes du fond se confondaient avec le ciel, on ne voyait rien que les étoiles et à l'extrême horizon deux ou trois lanternes qui faisaient comme une ligne brillante sur la mer polie comme une glace. On n'entendait pas autre chose que le soupir que rendait de loin en loin la mer en laissant mourir sur la sable sa dernière petite ride. . . .*"

The only qualities Regnault inherited from his father was his strong will, his perseverance and his energy. From the obscure position of an errand-boy, Regnault *père* rose to be Professor of Chemistry at the Collége de France, *directeur* of the Sèvres manufactory, and member of the Institute. A true man of science, there was little in common between father and son; indeed, there was more fear than love on the side of the younger man. When "Judith" was sent from Rome to Paris, Regnault wrote, "Do not show my picture to any one, *not even, especially not*, to my father." Sent, in 1854, at eleven years of age, to the Lycée Napoléon, he seems to have done well during his six years study, and, until he had passed his examination for the *bachelier ès-lettres*, his father would not let him have drawing-lessons — indeed, he seems to have done all he could to crush out his love of art. But all the boy's spare time was spent in drawing, at the *Jardin des plantes*, in the stables of St. Cloud, and in the Rennels at Meudon. His school books were covered with sketches of his friends, illustrations of the battles of history, and imaginary subjects from Greek mythology. In M. Marx's book is a re-production of a sketch done when he was twelve years of age, of some linesmen and a mounted officer, "Waiting for the Queen of England," which is full of character and discrimination. At fourteen he modelled one of the emperor's horses. His first lessons were some hints from Troyon (who also lived at Sèvres) and M. Montfort, a friend of the family, and a rather indifferent painter of Oriental subjects. Can it be possible that these two men, whose intercourse with Regnault was so slight, in any way influenced him in choice of subject? or did they simply help to develop his natural tastes?

When Henri left college, his father still persisted in stifling his son's enthusiasm by addressing himself to Ingres and Flandrin, neither of whom had time to devote to the boy's artistic education; but it was at their suggestion that he was confided to M. Lamothe

[1] "*Les artistes célébres. Henri Regnault*, 1843-1871," par Roger Marx, Paris, J. Rouam, 29 Cité d'Antin. Broché, 4 fr.

and at the end of 1863 he entered the studio of M. Cabanel at the École des Beaux-Arts. The year before Regnault had failed in the *concours* for the Prix de Rome, but this year (1863), he tried again; but although his work was placed seventh or eighth by the judgment of his fellow-students, he failed through his innate rebellious spirit. "M. Lamothe no longer seems to interest himself in me, because last year after my failure, I set up at Sèvres instead of going back to the atelier where the light was detestable, and where I worked with less ardor than by myself, and at uncongenial subjects. At the same time I shall always have great affection for my good master, and shall ever feel grateful to him. . . . But for some time he has left me no liberty in my studies, and always wants me to paint what I do not see. I dare not discuss his narrow ideas with him, and I do not know how to do what I see, and yet not be disagreeable with him."

In 1868, a change came over the young man. Up to this date his ideals had been Titian, Ribera, Michael Angelo, Correggio, and (!) Cortona; but now he became acquainted with Fortuny, whose influence Regnault did not live long enough to grow out of. "*J'ai vu des études de Fortuny qui sont prodigieuses de couleur et de hardiesse de peinture. Ah! qu'il est peintre ce garçon-là! Quelle couleur amusante, quel esprit, et quelle justesse dans la touche!*" His first *envoi*, from Rome, "Automédon," scandalized some of the members of the Academy by its exaggerations, its vigor and its departure from *le réglement*. "In what terms is this rebel to be addressed?" they asked. But Regnault had a champion in Pils, who cut them short by asking, "which of you, gentlemen, would be certain to do as much?" An accident, the result of his headstrong daring in mounting a horse which had already thrown several riders, led to an illness which obliged him to leave Rome, and he sailed for Spain. There his enthusiasm knew no bounds. Velasquez is the "Molière of painting, the first painter in the world." He wished to "swallow him," and reproduce him in his entirety. "The Spanish masters are of more use to us than Michael Angelo or Raffaello; they allow you to enter more into intimacy with them. They do not try and hide their methods of execution from you, they ask nothing better than to show you how they work, and do not crush your efforts with their contempt."

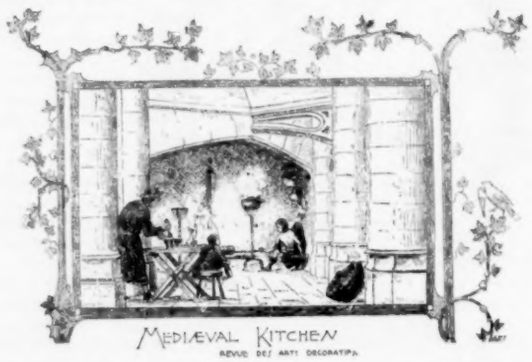
And now came the Spanish Revolution, in which Regnault and his friends played a conspicuous part. They seem to have been in the thick of it, singing the "Marseillaise" in cafés, and witnessing the triumphal entry of Prim. So full of enthusiasm was Regnault that he naturally felt rejoiced when he was commissioned to paint the portrait of the Marshal. The horses in the royal stable were placed at his disposition, he had a riding-school to paint in; everything in fact, but sittings from Prim, who was too busy to give up the time. How could the picture fail to be more a portrait of the horse than of the man? "Do not resent it, if you do not find the good man's head finished enough; he did not pose a single second, and I could find no photograph which would help me. . . . I passed two hours in his study, seeing him write with his spectacles on. . . . In spite of all, people find it very like him." Not so Prim, "He was represented at the head of a pack of brigands, a disgusting man who has not washed his face. . . . He was twenty years too old, with a look of fear. . . . And why such a want of *tenue*, and the hair in such disorder?" The painter had the wisdom to guard a discreet silence, although he intimated that he would not alter the picture. "Prim was to forget it like a bad dream," which probably he did, as, after making an *amende honorable*, he refused to pay for it.

The beggars seem to have called up Regnault's enthusiasm as much as everything else that was Spanish. "We have to-day had an honest family, father, mother and child who posed most conscientiously, and expressed their gratitude for forty sous." And how energetically he worked! "At a quarter to 8, a study of a begger to be finished; at 11-30, a visit to Fomento to study a fine Goya; at 1, a sitting for the small portrait of Madame de Barck, in red and black Spanish costume, which *entre parenthèses* becomes her vastly; at 4, a walk to the Salle de Toledo, to see an ancient mantilla, and probably to buy it; at 5, a guitar lesson; dinner at 6; at 7, working again in the atelier. And every day is like this, and it ought always to have been like that." His account of his sojourns with the gypsies is amusing, but too long to be quoted here (Page 54). When Regnault was compelled to return to Rome to finish his second *envoi*, he speaks of being obliged to *dépayser* himself, and his letters are filled with lamentations. "Rome did not suit him; he could not breathe; I feel like the little *gourmand*, who having been eating tarts at the pastry-cook's, only finds a piece of dry bread at home; I am hungry, and I have nothing to eat. There are too many beggars, too many foreigners, too many guides; I would willingly leave all, to find a corner of the earth where I should not be bored by the sight of a green veil or a parasol." But his "Judith" had to be finished, so "no more love, no more riding, no more music; nothing but painting;"—and painting be it remarked, which was not to his taste. Academic studies might have been of value to him, had he lived longer; but dying young as he did, we cannot but lament the time spent upon them. Regnault's talent and his passion were for color, and brilliant effects of light; for all that was picturesque and bizarre. Had he been able to visit India, we should probably have seen the first really artistic representations of it. Vereschagen has done something in this line, but Regnault was a far greater genius, and his teaching of a higher order. As soon as possible he returned to Spain and all his enthusiasm revived. Thence he visited Gibraltar and Tangiers, and so charmed was he with that "*ville de neige*," that he bought a house, and set up an atelier with his friend Georges Clairin. Here the "Salomé" was finished, that much disputed work which set Paris in a blaze in 1870. "That blinding prodigy of Chymistry;" "It is not high art, it is great talent," said M. Ménard. "An incontestable *chef-d'œuvre*," replied Edmond About; while Théophile Gautier exclaimed, "Prim, *c'est toute l'Espagne;* Salomé, *c'est tout l'Orient*." And so on, *ad infinitem*, people feeling so acutely upon the subject, that nothing was talked of, nothing written about but Salomé; for three or four weeks, Paris was divided into two camps; Salomé worshippers and Salomé detractors. But neither friends nor enemies spoiled the painter, and we find him modestly writing that "up to the present time, I have only learned to speak and to eat. . . . All that I have done does not count. . . . I shall commence to decline the moment that I am satisfied with myself." He sketched out a plan of life which would be free of "*petits crevés*," and where "one need not light the lamp at half-past 12 o'clock;" but the war commenced, and far from accepting his exemption as Prix de Rome, he left Tangiers and entered a corps of franc-tireurs. He very soon became disgusted with his companions; and he then joined the Sixty-ninth Batalion of infantry with many other artists, Boulinger, Clairin and Baudry, who, it is said, expressed the desire, that, in the event of his being killed, Regnault should be allowed to finish his Opéra decorations. Fate willed otherwise; and it was Regnault's idea for a grand picture illustrating the domination of the Moors in Spain, which was carried out by a friend — his faithful friend and constant companion, Georges Clairin.

The exhibition which was held at the Beaux-Arts after his death, and appropriately called a "*fête de douleur*," showed the wonderful versatility of the painter; there was no sort of subject that he did not attempt. His instinct was that of the true artist who loves his work for work's sake, not for its subjects; portraits, landscapes, still-life, animals, architecture, all are equally easy to him. Perhaps his *forte* was light; he seemed able to metamorphose paint into Eastern glare; and it is curious that fate should have obliged one who expressed on every occasion his "*haine au gris*," to return north at the very worst time of year, and to suffer the severest cold which had been known for four decades. By his untimely death, art lost much, for, in his own works, he had only just begun to talk. The future would, doubtless, have revealed powers, of which his short life had only given some earnest; and however much we may admire his patriotism, we cannot but regret that a more commonplace brain could not have been sacrificed to the demon, War.

S. Beale.

"THE INFLUENCE OF GROUND-WATER ON HEALTH."



THIS was the subject taken by Mr. Baldwin Latham, M. Inst. C. E., President of the Engineering and Architectural Section of the Sanitary Congress, held last month at York, England, for his address. He said:

In presiding over this section, which is devoted to engineering and architectural subjects, it is necessary that I should say that I have been requested to address you upon a subject which properly belongs to the Climatological Section, namely, upon the probable influence of ground-water upon health. This request has, no doubt, been made in consequence of some observations which have been made in this city by Mr. North, the medical officer of health, who has traced some connection between an outbreak of typhoid fever which occurred here in 1884, and the movements of the subsoil water at that time.

Having devoted much time during the past eleven years specially to the study of the question of underground-water, and having established and maintained a number of stations for observing the relative height of subsoil water in various parts of the country, and having also collected the past records which are available in this country and elsewhere, I am in possession of facts not easily obtainable, and am able, therefore, to draw some definite conclusions as to the probable influence of ground-water upon health. Having regard to what may be called historical records, great periods of drought clearly indicate a low state of the ground-water. In looking through ancient records there are some remarkable references to the influence of drought in producing disease. The influence of light in destroying noxious properties arising from decomposing matter is also clearly indicated, and it is pointed out that the effect of keeping back the waters of the sky, and not suffering them to be poured down on

the earth, would be that the noxious animals which live in the water will pollute it.

No inquiry into the question of the influence of climate on disease would be complete without reference to the labors of Hippocrates. It is curious to note in his works, written upwards of 2,000 years ago, that there are conditions recorded, attending healthy and unhealthy seasons, which are identical with the conditions which may be observed in this country at the present day. Hippocrates taught that all disease may be traced to natural causes, and he counted it impiety to maintain that any one more than another is an infliction of the Divinity. He pointed out to his followers that if they wished to study medicine properly, in the first place they must study the seasons of the year, and the effects which they produce. He also stated that acute diseases occur in periods of drought, and that you could tell what epidemic diseases would attack a city either in summer or winter, and what sickness each individual would be in danger of experiencing. He went much farther than our knowledge at the present time enables us to go; for he stated that the changes of the seasons may be predicted from the rising and setting of the stars, so that we should know beforehand what sort of a year is going to ensue. Hippocrates also pointed out the conditions affecting a healthy period. Rains in autumn, a mild winter neither very tepid nor unseasonably cold, and rain in spring and summer, the year is likely to prove healthy; but if the winter is dry and the spring showery, the summer will necessarily be of a fertile character. If, at the rising of the dog-star, rains and wintry storms supervene, there is reason to hope that disease will cease, and the autumn will be healthy.

It is curious that a dry winter is often the precursor of disease, not at that time, but in the following autumn. As a rule, a short supply of rain in December has a most marked influence upon the stores of underground water, and a deficiency of rain in this month has probably a greater effect in influencing the future health of any particular district than it has in any other month of the year. As a type of a healthy season the present year is an example, and fully complies with the conditions laid down by Hippocrates.

It may be interesting to note that some years ago Dr. Laycock published an interesting account showing the incidents of disease in York, from which it appeared that this city was always susceptible to violent outbreaks of disease, traceable to local sanitary circumstances combined with peculiar climatological conditions, and that there appeared the same incidence in the prevalence of the sweating sickness of 1550-51, the plague of 1604, and the cholera of 1832, to which might be added the typhoid fever of 1884.

The results of my prolonged investigations on the subject of ground-water in this country and elsewhere, clearly show that there is generally a direct parallelism between the conditions of health and the volume of ground-water. The years in which there has been a large quantity of ground-water present have invariably been the healthiest years, while those in which there has been a small quantity have invariably been the most unhealthy periods.

As a rule, the lowness of the ground-water indicates the future health, and not the state of health at the particular time of lowness; that is, the unhealthy period, as a rule, follows the period of low water, the degree of lowness indicating the intensity of future disease, especially fever. In some cases an unhealthy period runs concurrently with the period of low water, but in all these cases there is clear evidence that percolation has recommenced before the unhealthy period takes place. These results are entirely confirmed by observations which were carried on in Paris between the years 1868 and 1883, and which have been collated and published by M. Durand-Claye, chief engineer of the municipality of Paris, with the object of putting all the facts and circumstances in connection with the outbreaks of fever in Paris at the disposal of those who might choose to investigate the subject — a course strongly contrasting with the conduct of some authorities in this country, who desire rather to hide the true facts from public view.

The observations which have been published by Professor Pettenkofer, and which were commenced in 1854, differ from the experience gained in this country, as he has shown that typhoid fever in Munich commenced with the fall of the subsoil water, and reached its greatest intensity with the greatest degree of lowness, and with the rise of the water there was a diminution of fever, a result exactly contrary to experience in this country. Professor Pettenkofer's observations, however, agree with the observations made here, in the fact that the greatest intensity of typhoid fever coincides with the periods of the greatest degree of low ground-water; that is, those years in which the subsoil water has fallen to its lowest level are those in which there has been the most fever.

With regard, also, to the experience in this country as to subsoil water, it may be pointed out that there is clear evidence that the lowering of the subsoil water by artificial means will produce, and does produce, a tendency to the development and dissemination of typhoid fever. The effect of drainage works during their construction in lowering the subsoil water where precautions have not been taken to speedily and permanently get the water back to its proper level has been, in many instances, the cause of outbreaks of typhoid fever, but which, at the time, have been attributed to the construction of the sewer works and to sewer-gas, even in cases where no connections had, at the time of the outbreak, been made with the sewers.

It may also be pointed out that at the time of the outbreak of cholera in East London, in 1866, as to the cause of which there has been so much dispute, the very district which was most afflicted with cholera had, at the time, its subsoil water unduly lowered by the construction of the main drainage works in that part of the metropolis, and on the completion of this work and the sewers being brought into operation the epidemic terminated. . . .

It is curious that in recent times, as a rule, there has been, every ten years, a marked period of low water; for example, in 1834–5, 1844–5, 1854–5, 1864–5, 1874–5, 1884–5. The lowest water in these series probably occurred in 1864–5. In 1844–5 the low water was not intense, but it was low compared with the period. In addition to these periods there are other times of low water, and in investigating the subject it should be studied locally and comparison made with local vital statistics, for the largely-varying distribution of rain tends to equalize results when spread over large areas, as it is rarely that the same conditions occur over extended areas at the same time.

I have been carrying on, as many of you know, very extensive observations at Croydon, and from the results there obtained have extended them into various geological formations in different parts of the country.

The register of Croydon goes back to the year 1539, and, with the exception of years in which there has been revolution or disturbing causes of a kindred character, the record is complete. A tabulation of the whole of the burials and baptisms, extending from this early period to a date overlapping that when registration of births and deaths commenced, clearly indicates that years of drought are, without exception, the most unhealthy periods. In 1539, the first year of registration at Croydon, there is a record that in this particular year the springs were remarkably low, so low that the river Lea was nearly dried up, and writers of that age remark on the great draught and heat of that period. In that year the number of burials recorded in Croydon was 50, and the number of baptisms 55, indicating a probable death-rate of 25.6 per thousand. In the following year, on the rise of the water, the burials rose to 87 and the baptisms 72, indicating that the death-rate was nearly 32 per thousand. Coming to the period when we have rain-fall records, the year 1741 was a very dry time, the rain-fall at Lyndon for the year being 15.7 inches, and in that year the burials at Croydon were 271, and the baptisms 113, giving a probable death-rate of 63.7 per thousand, while in the two years preceding this year the death-rate was 27.7 and 40.7 per thousand, and in the following year 24.2 per thousand. Coming to more recent periods, when we have the certain records collected by the register-general, registration having commenced in the dry year of 1837, the death-rate at Croydon was 30 in the thousand, and in the following year a similar rate occurred. In the years of very low water, 1854 and 1855, we had death-rates of 26.84 and 21.14 respectively, while in 1851 the death-rate was only 18.72 per thousand. In the dry periods, 1864 and 1865, we had death-rates of 21.5 and 22.7 per thousand, while in 1860, a wet year, and one of high springs, the death-rate was only 17.27 per thousand. The year 1871 was another dry period, but the low water at Croydon was not so pronounced in this year as in most other years. The death-rate was not so high, viz., 18.89 per thousand, but in 1873, when the springs were very high, the death-rate fell to 16.59 per thousand. After the dry period of 1874–75 the death-rate rose again to 21.10 per thousand. From 1876 up to the beginning of 1884, there has been unprecedented high water, and during the whole of this period the country generally has enjoyed a high state of public health. The conditions, however, which have brought about this high degree of health, have been disastrous to the interests of the agriculturalist, as the large quantity of water passing into the ground has washed away the fertilizing elements, but it has secured for us the estimable boon of good health by removing the conditions which are the cause of much sickness, suffering, and death. . . .

It is clear to my mind, after the most careful consideration of this subject, that ground-water itself has no influence, either for good or evil, upon health, but that the lowness or highness of the water in the ground is the index of conditions which greatly influence the health of all communities. We have periods of abundance of water and periods of low water with both healthy and unhealthy conditions. Ground-water has been shown by Professor Pettenkofer to be chemically more impure in periods of high water when the conditions were favorable to health than when there is a low state of the ground-water and a condition unfavorable to health. The records also show that we have periods when rain has started into existence malignant diseases, while, on the other hand, we have similar heavy rainfalls accompanied by a high state of public health, as in the present year.

The records clearly point out that it is not one circumstance alone which produces disease, but that there are at least three factors necessary for the production and distribution of disease, especially typhoid fever, viz.: 1. The elements which produce disease, such as a polluted state of the ground. 2. The conditions which are necessary for the development of disease, such as a period of dryness of the ground in those regions which water usually occupies, combined with a comparatively high degree of temperature. 3. Conditions which will lead to the spread of the disease, such as the probable influence of a storm or rain in driving impurities out of the ground into our water supplies, or through the instrumentality of ground-air passing into our habitations, and its reception by a population which is in a condition to receive such germs of disease. If any one of these conditions is absent, diseases like typhoid do not occur.

The long period of washing and purification which the ground has passed through since 1876, has generally so purified it from the producing elements of typhoid fever, that with the exception of occasional cases of impurity, where the ground has become fouled from the leakage of sewage from the imperfect sewers into the ground, as in the case of this city, Beverly, Kidderminster, and some other places which had epidemics in the low-water period of 1884, the country has enjoyed immunity from diseases of this class. On the other hand, if we take a period when there has been marked low water for a number of years, followed by unusually low water at particular periods, these are the times when typhoid fever is most rife, as, for example, between 1854 and 1865, with the exception of the years 1860 and 1861, when we had a high state of ground-water. The intensity of the fever rates of 1865 and 1866 point out a lesson which ought to be learned by every sanitarian, — that we must keep the ground free from impurity, if we are to secure conditions which are essential for the promotion of health.

When we come to deal with local conditions preceding disease, we find that not only cholera and typhoid fever, as pointed out by Professor Pettenkofer, are amenable to the conditions indicated by the highness or lowness of the ground-water, but probably all other zymotic diseases are influenced by the conditions which produce low ground-water, with the exception of diarrhœa. . . .

We must not, however, lose sight of other conditions which are at work, such as, —

(1) *The influence of light.* It will be observed with reference to the period of percolation that is almost parallel with the time the sun is below the horizon. The influence of solar light is well known in malarious countries, which may be traversed with impunity while the sun is above the horizon, but they become dangerous after nightfall. (2) *The influence of temperature.* There is no doubt that, in winter time, many diseases are aggravated by the intensity of cold, but cold is not essential to the promotion of disease, especially in children under five years of age. This was shown by the late Dr. Farr, and in the volume recently published by the Sanitary Institute it is pointed out that the death-rate of children in Norway is lower than that of England, while the death-rate of children in England is lower than in Italy, indicating that at this period of existence cold is not detrimental to life. When we come to isolate the deaths in particular months, and compare them with the periods of low water, it often happens that extreme low water in winter corresponds with periods of great cold, and low water in summer also corresponds with periods of great heat, and it is only at such times when we are able to discount these influences by comparing them with periods when we have a normal state of things with reference to temperature, and abnormal in regard to ground-water, that the influences measured by the ground-water are brought into prominent relief. . . .

A very marked circumstance in connection with ground-water and the period of percolation is shown in the case of deaths of children under five years of age. While there may have been mistakes with reference to the causes from which a child dies, very little error occurs with regard to its age. I am of opinion that the proper way of estimating the sanitary state of any period in any district, is by taking the number of children under five years of age and calculating the deaths by the number living at these ages. The figures show, especially after deducting the deaths from diarrhœa, which are influenced by high temperature, that there is an almost exact parallelism between the period of percolation and that of deaths occurring at those ages, the smallest number of children dying in the month of June, and the largest number in December and January. Moreover, the death-rate from year to year fluctuates in a very marked manner with the fluctuations of the ground-water. The most healthy periods in which there is the most ground-water, and the least healthy are those in which there is the least ground-water in any year. These results corroborate the strong relation which exists between the highness or lowness of water in the ground in regard to zymotic diseases. It also shows that there are influences at work which can be measured by the quantity of water in the ground, which are destructive to young life, and which may be guarded against, as these influences indicate themselves many months before they begin to affect the population; therefore "to be forewarned is to be forearmed."

The fluctuation of the water line is an essential condition in the development of disease, especially typhoid fever and cholera. It has been pointed out by Professor Pettenkofer that in those districts in which the rivers are held up at uniform levels by weirs, the conditions are favorable to health, and in such districts cholera rarely becomes epidemic. In a great measure this is corroborated in this country by the state of health at our seaside resorts, which being the natural outflow for ground-water, and owing to the uniform height of mean tide level, are without exception placed in a condition favorable to health. We have also the record in connection with the city of York, in which it is clearly shown by Dr. Laycock, in his report on York, published in the first volume of the Health of Towns Commission, that previously to the construction of the lock at Naborn, below the city, the tide used to flow up above York, and there were considerable variations in the level of the waters from time to time, but after the construction of the lock in question the health of York materially improved. The health of districts such as the Wandle Valley is proverbial. In the latter district there are a large number of mills in a comparatively short length, holding up the water to a uniform level.

With such examples for our guidance it is clear that sewers may be of great advantage in maintaining uniformity in the water level. On the other hand, leaky sewers are liable not only to pollute the ground, but to cause considerably greater variation in the levels of underground water than would otherwise occur in various parts of the district. Good land drainage has a tendency to produce uniformity of water level, but this should rarely be attempted to be secured through the instrumentality of sewers carrying polluted matters. The influences which are observed clearly point out how important it is to guard districts against pollution of the earth. How little regard, however, has been paid to this point, for it is only within the last ten years that the importance of making sewers as water-tight as possible has received serious consideration, and still, in many parts of the country, sewers are being constructed without any regard to water-tightness and their other influences on ground-water. Moreover, a large number of burial-grounds have been established, in quite recent periods, in positions with respect to underground water which more or less exercise a baneful influence on the health of the localities in which they are situated. Cesspools, ash-pits and middensteads are still permitted to poison the air, ground and water. No wonder that the towns which possess the means of most readily polluting the ground have, without exception, the highest rates of mortality. There can be no compromise in sanitary matters. What should be the aim of all sanitarians is the preservation of the ground from all impurities, especially in districts where the soil is of a porous character, and, above all, no supplies of water for dietetic purposes should be permitted to be taken from wells sunk in the immediate subsoil in populous places, and to secure the full measure of health, our houses should be so constructed as to prevent the admission of ground-air into them.

SOCIETIES

GERMAN TECHNICAL SOCIETY.

AT the annual meeting of the "Technischer Verein" (German Technical Society), of New York, held October 9, the following officers were elected: *President*, T. H. Miller, Mech. Engineer; *Vice-President*, G. W. Wundram, Mech. Engineer; *Cor. Secretary*, H. W. Fabian, Architect; *Prot. Secretary*, G. Landsmann, Chemist; *Treasurer*, A. Drögmundt, Mech. Engineer; *Librarian*, H. Bausch, Civ. Engineer; *Trustees*, A. Kurth, Civ. Engineer, P. Gopel, Civ. Engineer, A. Siebert, Mech. Engineer. The number of members at present is: Section of Civ. Engineers, 49; Section of Mech. Engineers, 87; Section of Architects, 35; Section of Chemists, 32; total, 203. Employers who are in need of assistants may address the Corresponding Secretary, H. W. Fabian, 705 Broadway, New York City.

H. W. Fabian, *Cor. Secretary.*

COMMUNICATIONS

INTERMITTENT *VS.* PERSISTENT DISCHARGE FOR SUBSURFACE DRAINAGE.

New York, October 9, 1886.

To the Editors of the American Architect: —

Dear Sirs, — Will you kindly permit me a few words of explanation in regard to the question raised by a correspondent in your issue of September 18, and referred to in a letter of Mr. C. W. Durham, C. E., in the issue of October 9, of your valuable paper. Speaking generally, I consider an *intermittent* discharge far preferable to a continuous overflow from a sewage-tank into a system of absorption tiles. In the special case referred to by Mr. Durham, and which you criticise, I omitted the usual siphon, principally because the owner of the country-house desired to have the work constructed as economically as possible. I should state that in his case the problem was a comparatively simple one, as it involved only the disposing of the waste water from a single bath-room, containing one wash-bowl, one bath-tub and one water-closet. No grease at all from kitchen or pantry sinks entered the sewage-tank. I explained to the owner that in doing away with the intermittent siphonic discharge I was not following my usual custom; that, indeed, I was trying a novel experiment, of the success of which I was not quite sure at the outset. Receiving the owner's consent to try the experiment, I built a small circular settling-chamber of brickwork laid in hydraulic cement mortar. The soil-pipe from the bath-room discharges into this settling-chamber in the usual manner; but the outlet from the tank was not, as stated by your correspondent, "a simple overflow," but consisted of a series of six or seven small overflow pipes, each having a deep dip into the chamber, so as to prevent any solid matter from being carried over into the absorption tiles. These overflow pipes were placed with great care at as nearly as possible, the same level, and were thus made to take each a share of the overflowing sewage. The object of this arrangement was to insure an equal or nearly equal distribution of sewage into each of the six or seven rows of tiles. The bath-tub and water-closet being used only at intervals, the discharge from the sewage-chamber was comparatively intermittent,

and, to a certain extent, approached an intermittent siphonic discharge, inasmuch as at each use of the bath-tub a rather large volume was sent suddenly into the tiles. So far as I know this system has worked to the entire satisfaction of the owner, during a period of two years, without clogging up or necessitating the removal and relaying of the tiles.

I fully agree with you that in the case of larger sewage-tanks, the intermittent discharge is essential, as well as better and cheaper in the end. I am now preparing the plans and specifications for a 30,000 gallon sewage-tank, to be built at the Hospital for the Insane, at Middletown, N. Y., and have recommended in my preliminary report an intermittent discharge. I explained to the Building-Committee that it was comparatively immaterial how this intermittent discharge was effected, and left to them the choice between a simple gate-valve arranged to be operated by hand once a day, and an automatic siphonic arrangement. The latter was considered by them far superior, as doing away with the necessity of constant attention to the tank. In the case of country-houses having a large amount of plumbing fixtures, I also consider an intermittent automatic discharge as vastly preferable, and I do not consider the addition of a siphon, of whatever make, as complicating the work to any extent.

Respectfully yours, WM. PAUL GERHARD, C. E.

UNSOLDERED CROSS-SEAMS.

ORLANDO, FLA.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you please answer by letter the following, and oblige? Is it good practice to lay a standing-seam tin roof with unsoldered, single-locked cross-seams on roofs of little pitch? I have a roof in charge which of necessity has only $\frac{3}{4}''$ to 1′ pitch, and the tinners, in the absence of specifications to that effect, refuse to solder the cross-seams, and contend that it will not improve the roof and is not good practice. Am sorry to trouble you with the question, but have no other means of finding out.

Yours truly, ARTHUR C. ALDRICH.

[WE should think the pitch too low for cross-seams without solder. — EDS. AMERICAN ARCHITECT.]

PLUMBING JOINTS.

HARTFORD, CONN.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In what early issue of your paper did you accurately describe the various joints used in plumbing work? What is the particular name of the curved coping sometimes put over Renaissance cornices in interior work? Shingles on upper stories of houses are often carried out the same way for practical reasons. Would the same name be applicable, or would the present "apron" be better?

Respectfully, H.

[1. SEE Mr. Putnam's "*Sanitary Plumbing*," in Vol. XIV. 2. We know of no name for the curved weathering for cornices. — EDS. AMERICAN ARCHITECT.]

NOTRE DAME DE LÉPINE.

BROOKLINE.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In the issue of August 28, the article "An Editor's Trip Abroad," has an illustration of a "doorway of Notre Dame de Lépine, France."

Would you kindly inform me where I could find further information of the town Lépine, as I understand it to be a town, and of this church. Very truly yours, MRS. D. H. R.

[LEPINE, or L'Epine, is a little town in the Department of Marne, not far from Châlons. All we can discover about the church of Notre Dame is that it dates from the fourteenth to sixteenth centuries, and is styled a "miniature cathedral." — EDS. AMERICAN ARCHITECT.]

ELEVATED RIDING-RINGS.

NEW YORK.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I have in hand a scheme for a boarding and livery stable, in connection with which will be a riding-ring built on the fourth floor, and whose area is to be entirely unobstructed; the plot is about 70′ x 100′.

I write to ask whether you can tell me anything of the construction of the St. James Riding-School, on Washington Street, above Dover Street, Boston, which, I am informed had an elevated riding-ring, and which collapsed several years since.

With the proper calculations made for both dead and live loads and the resultant vibrations, I fail to see why an elevated riding-ring should not be constructed and be compatible with perfect safety and be made to pay on a circumscribed city lot.

If yourselves or any of your readers should happen to be familiar with the facts of the case above cited, or could note any other instance of an elevated riding-ring, a brief description of the construction and dimensions would be gratefully appreciated by

Yours respectfully, GEORGE MARTIN HUSS.

[WE have been able to learn only that it was not the St. James Riding-School that fell down, but one known as Draper & Hall's. But better than either and larger is one on Washington Street, above Dover, of which the ring is about ninety-six feet across and octagonal in shape. This ring is in the second story, and is supported on iron columns which do not interfere with the use of the carriage-room below. Each of these three rings is in an upper story of its respective building. — EDS. AMERICAN ARCHITECT.]

CASTING FLUTED PLASTER COLUMNS.

CLEVELAND, O.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I want to run some fluted columns with plaster, say, 6′ in diameter at the base, 4′ 6″ at the top, and 40′ high; how can I do it so that the flutes and squares will diminish gradually from the bottom to top? Please answer, if you can.

I am yours, etc., JAMES SMITH.

[IT is impossible to run diminishing fluted columns. They must be worked by hand, or cast in sections. — EDS. AMERICAN ARCHITECT.]

A POROUS WOOD-PRESERVATIVE.

BOSTON, October 9, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — It is gratifying to observe that what is now known as "the mill floor," to wit, heavy beams set wide apart covered with solid plank, is being introduced in many city buildings. I have observed in one or two cases a cause of danger where this method has been adopted which is easily avoided and which should be very carefully avoided. I examined a building yesterday in which all the beams have been varnished. This may be fatal to the stability of the building. If the pores are stopped by an ordinary paint or varnish, what is known as dry-rot may and probably will occur, to the total destruction of the beam within three years. I have had such a case in a factory under my own administration, and I know by bitter experience what the danger is where the seasoning of these timbers is prevented by putting a water-proof covering of any kind on the outside. If it is thought necessary to treat these beams in any way until after three years, I may recommend a new wash lately invented by Professor John M. Ordway, which can be obtained from Mr. G. F. Ordway, 766 Dudley Street, Boston. It is, to a certain extent, a preservative of timber and a fire-resistant. It is porous, and, therefore, will not cause timbers to rot. It appears to have a good surface for the reflection of light, and could hardly be distinguished from a good paint; in some respects it is preferable to a paint. What its durability may be I cannot state from experience. It is intended for inside use only, but anything invented by Professor Ordway would be very sure to possess great merit.

Very truly yours, EDWARD ATKINSON.

RELATIVE STRENGTH OF WET AND DRY TIMBER.

BOSTON, October 11, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — On page 168 of your issue of last week is a clipping from the *American Miller*, which strives to show that green lumber is stronger than dry, despite the contrary statements of all authorities on the subject. A little calculation, however, will show that it is only another case of over-loading, so common in the West. The beams, we are told, were of pine (presumably Michigan pine), 3″ x 12″, 12″ on centre and 12′ long. To make the case as strong as possible we will assume the span as 11′. The greatest safe load, then, per lineal foot of span, should not exceed $\frac{2\times3\times(12)^2\times100}{(11)^2} = 714$ lbs.

Assuming the weight of wheat at 85 lbs per cubic foot, the load per lineal foot on the beams when green was $26\times85 = 2210$ lbs., or over three times the safe strength, and in the neighborhood of the breaking strength. This load undoubtedly crippled the beams, so that when the next load was put on them they broke. A few years ago the writer made a long series of tests on white-pine beams, by which it was shown that one-half the breaking-load on a beam will ultimately produce fracture. Very likely the sap in the pine added somewhat to its stiffness, but the beams were so short in proportion to their depth that they would break without showing any great deflection. The most crude calculations should have shown the designer of the building in question that the beams would break in time, even under a much less load than 24 feet of wheat.

Yours truly, F. E. KIDDER.

NOTES AND CLIPPINGS

A VISIT TO THE GRANDE CHARTREUSE.—From the chapel a gallery named the Allée des Cartes—because it contained, until the Revolution laid its rude hand upon them, pictures representing most of the old Carthusian houses—leads to the Chapter-House, where the Chapter-General holds its annual meeting, and which contains, in addition to a fine statue of St. Bruno, portraits of the first fifty generals of the order. Some of these portraits are very poor works of art, but they are supposed to be faithful likenesses, most of them having been done from life. Into the functions of the Chapter I need not enter, and will go on to speak of the cells in which the monks pass nearly the whole of their lives. These are approached as one comes out of the Chapter-House, and open on to

what is called the Grand Cloister, a gallery 705 feet long and lighted by 113 windows. This is longer than the Roman basilica of St. Peter's, and it combines three distinct orders of architecture, for the Grand Cloister was not built all of a piece, the first part having been erected as far back as 1132, after an avalanche had destroyed the existing monastery. Opening on to the cloister are the cells in which the monks spend their lives, and over each is some such inscription as: "*O beata solitudo, o sola beatitudo!*" The cells are all exactly alike, and a description of one will do for all. That which I inspected was occupied by a young Englishman, the son of a Suffolk clergyman, who had gone over to the Church of Rome, and who himself had felt the vocation for a contemplative life. He had only been one or two years at the Grande Chartreuse, but there was upon his face that contentment which, as St. Augustine says, comes up from the heart to the countenance and tells of a mind at peace with itself. There are two stories to the cell, upon the ground floor being a room for cutting and storing wood, and another with a lathe and carpenter's bench. Upon a level with these, but in the open air, of course, is a small garden; for the Carthusian rule is that the monks should seek relaxation and exercise by gardening, carpentering, and so forth, rather than by walking. This is very wise, I think, for the mind is always more or less upon the stretch when one is walking, whereas in gardening and carpentering one can exercise the body and at the same time must direct one's thoughts into an entirely new channel. Upon the floor above, which is reached by a narrow flight of steps, is the room in which the monk lives. It is divided into two by a wooden partition, but the first room is merely furnished with a table and a chair, and it is here that he takes his single meal. For though the monks are allowed a little bread and wine in the evening—except at the great feasts—they have only one meal a day, and that, with neither meat nor any of the luxurious dishes which good Catholics partake of with a good conscience upon fast days, is but a modest one. The inner room contains a bed, which is enclosed in an alcove, and is not unlike those with wooden skirting to the sides often met with in old Dutch houses, and it is *outside* this bed, which is innocent of sheets or pillow-cases, that the monk takes his rest. In former times there were shutters to the bed, so that in cold weather the occupant could pull them to, but this being deemed unhealthy, they were removed, and a couple of blankets are now provided. The room has no other furniture save a washstand, but in an inner recess there is a writing-table with some book-shelves over it, and this is literally all, excepting, of course, a crucifix over the bed and another over the writing-table. The food is passed in through an aperture in the door before the ground floor, as the monks of La Grande Chartreuse only take their meals in the common refectory upon Sundays and certain high festivals, and when they do so no conversation takes place, a lay-brother reading from a lectern in the gallery which overlooks the refectory verses from the Bible or a chapter from one of the fathers of the Church. Upon Sunday evenings each monk comes to the door of the refectory and asks as a beggar in the name of Christ for alms, the lay-brother giving him a piece of bread and saying: "*Requiescat in pace.*" This refectory, built in 1371, was restored in 1494 by the liberality of Margaret of York, widow of Charles the Bold; and among other English princes who have been benefactors of La Grande Chartreuse, I may mention Cardinal Henry of Lancaster, who rebuilt part of the monastery in 1444; Edward III, who had contributed towards the restoration of the church in 1371; Henry II, who assigned to the Grande Chartreuse in 1185 a perpetual (?) income upon the English exchequer, and Richard Cœur de Lion, who confirmed this gift a few years afterwards.—*Temple Bar.*

Decadence at Versailles.—The citizens of Versailles have petitioned the French Chambers to save the palace and park of Versailles from falling into ruin. One of the buildings which bears the inscription "A toutes les Gloires de France," has already lost all its sculptural ornaments, and the condition of the upper cornices is such as to be dangerous to passers-by. The terraces of the *orangerie* are in a similar state. Hundreds of trees, particularly the beeches, many of which date from the time of Francis I, are dying. Little Trianon is in a comparatively good state, but Grand Trianon has become a perfect wilderness. For two years no gardener has entered that magnificent park, whose paths and basins are overgrown with grass. One of these basins is a total wreck, English (!) visitors having broken the arms off the statuettes surrounding it. Formerly, the cost of keeping the palace and the garden of Versailles in repair was defrayed out of the civil list.—*N. Y. Evening Post.*

A new Way to collect a Lien.—All the world loves a lover, according to Mr. Emerson. Charles Ohman, a Chicago contractor, who built a house for Andrew Anderson, in which the latter was married, took occasion, just as the wedding was well under way, to take possession and endeavor to nail up the doors and windows, because he had a lien on the building for an unsettled balance. All hands turned on the intruder and put him out, and there was such a row that the police wagon was called and the entire party arrested except the minister, who escaped. After explanations all were released but Ohman, who was held and fined. The others went back, found the minister, and Anderson was married.—*N. Y. Commercial Advertiser.*

TRADE SURVEYS

The writers of financial and commercial reviews in the leading daily and trade papers of the country, in endeavoring to arrive at results, permit themselves to be misled by the unfavorable statistics of through traffic. They ignore unintentionally the enormous increase in traffic and business in the interior which shows itself only in local traffic. The tonnage shipped westward from New York by the trunk lines and canals for nine months this year show an increase of only two and one-half per cent over the shipments for the same time last year. The trade statistics of our large manufacturing and commercial centres show less and less of the trade movement each year. There is an enormous volume of unreported business throughout the country at large. There is no easy way of getting at this total, and yet, a proper understanding cannot be had without such material. Yet even the scattering railway returns available show that we are making healthy progress. The returns from seventy-eight roads for September, and for nine months this year over nine months last year, exhibit a healthy increase. Railway mileage is also increasing rapidly, and the construction this year will, no doubt, be fully double that of last year. The returns from a score or more of industries, so far as they can be relied upon, indicate not only a great increase in the volume of business this year over last, but indicate a further and increasing volume of business to be taken care of during the coming months. Builders, investors, manufacturers and merchants have been watching trade and trade-features with a keen eye to see whether the improving conditions of the past year or more are likely to continue. It is easy to draw erroneous conclusions. It is pleasant to deceive ourselves sometimes. It is as possible to make mistakes now as one, two, or three years ago. The possibility of drawing wrong conclusions is greater now than heretofore; it is, therefore, very necessary to probe every fact with skill, and to detect whatever elements of weakness there may be. It is known among capitalists that there is a desire and intention to make very heavy investments next season, not in one or two channels, but in many. Heretofore railway has been our favorite pastime; there will be less of this hereafter. There are some forty or fifty railroad-building schemes before the country which, in all probability will go through. They are in the hands of strong American and British capitalists. It is not the intention of their managers to peddle their stocks in the open market. Comparatively little is said of these enterprises beyond the mere announcement that such enterprises are projected. Rail-makers, locomotive-builders, and railway-supply men, have knowledge of most of these projected works. If nothing intervenes they will be set on their feet next spring. The discussion in reference to them is not whether they will eventually pay, but whether the year 1887 is a good year to project enterprises calling for the expenditure of hundreds of millions of capital. The investors would willingly and gladly wait a year or two longer before inaugurating their schemes if they thought that the pushing of them next year would result in or produce a crowding up of prices. This is the question at issue. It is a difficult one to determine. The conditions are right for an improving industrial activity. There is an abundance of money ready for the work. A ten or fifteen per cent advance would cause the projectors of a score or two of great enterprises no inconvenience provided it should not be followed by a reaction a year or two later. In short, the manufacturers, capitalists, and builders of to-day want to feel assured against the ups and downs of prices and the violent fluctuations of trade which do so much harm.

The facts presented in their briefest shape are these: the enormous producing-capacity of the country is the best guaranty against either an overproduction on one hand, or a wild anticipation of requirements on the other. The effort is now being made in all of our industries, to broaden their foundations far enough so that there will be no occasion for buying this week or month what will not be wanted for three or six months. The railroad-builders are obliged to do this just now. They have been once more taken by surprise. Had they known last year what they know now, they would have built 6,000 miles of railroad instead of 3,000, and the managers of our 130,000 miles of railway would not have permitted their rolling-stock and locomotive-power to run down to a point which has made it necessary this year to let freight blockade itself all over the country, and to disappoint shippers and consignees with unnecessary delays. The railroad-builders have bought a quarter of a million tons of rail this autumn, to be furnished them next spring. There are inquiries on the market to-day for no less than 100,000 tons of rail. The railroad-builders do not now know whether to build, or arrange to build, six or eight thousand miles of road next year, or ten or twelve thousand miles. If prices remain where they are, or are likely to remain, the highest figure will be reached. The same policy will guide the leaders in every other industry. It is not higher but lower prices that are feared. Not the effects of a healthy activity, but of an unhealthy reaction. The locomotive-builders have instructions and orders to hasten forward their work, and are advised by inquiries for next year's work not to let their capacity decline. Last week orders were given by two trunk lines for 5,000 freight cars. The railroad companies generally will crowd the railroad-supply capacity of the country all winter. There is an urgency which points to a busy year from January 1. There is no doubt but that an improving traffic will increase expenditures which have already been delayed too long. The same healthy activity is observable in the mining industry, in the lumber industry, in petroleum, in implement-making, in machinery-building, and in all directions. The leaders of our industries know the danger that besets them; they are, therefore, doing their best to guard against it, believing that the producing capacity of the country will be expanded with sufficient rapidity to prevent any unnecessary advance in prices, or impart any undue activity.

All these considerations underlie a proper understanding of the building interests. A large amount of money has been offered to push building enterprise, to lay out new towns, to establish new industries, lake and river and ship lines, and to inaugurate important engineering enterprises. Our advices from interior New England points seem to be satisfactory to architects and builders as regards next year's probabilities. Very favorable advices have been received from New York, Philadelphia, Chicago and St. Louis. There is a healthy activity in real-estate operations. City and suburban real estate is changing hands to be built upon. A great many large structures for business purposes are to be built next year in New York, on which architects are at work. The upper section of the city between Sixtieth and One Hundred and Twenty-fifth Streets, and between the park and the river, will be the centre of the great building activity. Two important enterprises are attracting attention in Philadelphia. One is the projected construction of an elevated railroad passing through the city parallel with the Delaware River, and extending to the extreme northern limits of the city. Another is the projected construction of an underground system with numerous convenient stations. The capital for both these enterprises seems to be ready. In Chicago the leading builders there speak of the very strong probabilities of a very active building season during the winter and spring, particularly in the direction of business edifices. There is also a very great demand for more small houses in that city and in several of the manufacturing towns of that State. These favorable prospects are leading to activity among material and supply men and among the makers of small machinery-tools and engines. It is not, therefore, to be wondered at that prices are firm, that confidence is strong, that real estate is pointing upwards, that railroad-builders are confident, and that universal preparations are being made to harvest all the results which enterprise can plant.